



Missouri Department of Health and Senior Services

P.O. Box 570, Jefferson City, MO 65102-0570 Phone: 573-751-6400 FAX: 573-751-6010
RELAY MISSOURI for Hearing and Speech Impaired 1-800-735-2966 VOICE 1-800-735-2466



Jane Drummond
Director

March 5, 2007

Dear Colleagues:

I am excited to share with you this copy of the *State of Missourians' Health Report*. This report is the first-ever statewide, comprehensive yet concise health assessment. The report highlights the biggest health challenges faced by our state today. It includes a comparison of Missouri with the United States in 10 key population health indicators. In addition, the report assesses the health problems and health risk factors of Missouri citizens by their life stages – infants and children (birth through 9 years), youth (10 through 17 years), adults (18 through 64 years), and seniors (65 years or above). The report also contains lists of intervention strategies based on well-researched literature for the major health problems and health risk factors in each life stage.

Further, the report demonstrates that many of the Missouri Department of Health and Senior Services' programs are targeting the right areas. Over the past two years, the Department has developed a plan to help address the state's obesity problem. To help reduce smoking rates, the department has implemented a new program that provides telephone counseling and information to people who want to quit smoking. Other programs within the department focus on preventing and managing some of the state's most serious health concerns, including heart disease, diabetes and cancer. According to this report, these diseases and conditions are reducing both the length and the quality of life for thousands of Missourians; many of those diseases and conditions are preventable.

In summary, the *State of Missourians' Health Report* will help us fine-tune our focus on the areas that can have the greatest impact on improving people's health. This information will help us work toward our goal – Healthy Missourians for Life.

Sincerely yours,

Bao-Ping Zhu, MD, MS
State Epidemiologist

www.dhss.mo.gov

Healthy Missourians for life.

The Missouri Department of Health and Senior Services will be the leader in promoting, protecting and partnering for health.

AN EQUAL OPPORTUNITY / AFFIRMATIVE ACTION EMPLOYER: Services provided on a nondiscriminatory basis.

The State of Missourians' Health, 2005



Missouri Department of Health and Senior Services
Division of Community and Public Health
Office of Epidemiology
PO Box 570
Jefferson City, Missouri 65102

AN EQUAL OPPORTUNITY/AFFIRMATIVE
ACTION EMPLOYER
Services provided on a nondiscriminatory basis

Acknowledgments

We would like to acknowledge the following individuals for their contributions to the report (listed in alphabetical order of the last name, by organization).

From the Missouri Department of Health and Senior Services:

Joni Adamson	Susan Jenkins	Glenda Miller
Joe Betros	Bill Jermyn	Patty Osman
Carol Braun	Ray Juneau	Robin Rust
Lori Buchanan	Nisreen Kabeer	Wayne Schramm
Jeanie Bryant	Noaman Kayani	Mahree Skala
Scott Clardy	Amy Kelsey	Joe Stockbauer
Norma D'Eagle	Alice Kempker	Susan Thomas
Eden Dietle	Fazle Khan	George Turabelidze
Colin Duewell	Steve Kilfoil	Margaret Tyler
Ellen Ehrhardt	Mary Jane King	Mark Van Tuinen
Susan Elder	Harold Kirbey	Patti Van Tuinen
Venkata Garikapaty	Karen Kliethermes	Craig Ward
Nanci Gonder	Lyn Konstant	Joseph Weidinger
Lori Harris-Franklin	Benjamin Laffoon	Thomas Weiser
Kristi Hart	Garland Land	Janet Wilson
Eddie Hedrick	Mei Lin	Pamela Xavierius
Laurie Hines	David Litchfield	Shumei Yun
Sherri Homan	Qian Liu	Bao-Ping Zhu
Andrew Hunter	Anna Long	
Betty Jaegers	Deborah Markenson	

From the Missouri Department of Social Services, Division of Medical Services: Julie Creach, Brenda Roush

From the U.S. Census Bureau, Population Division: Gloria Mundo



Suggested Citation: Skala M, Lin M, Kliethermes K, Zhu BP, et al., Office of Epidemiology, Division of Community and Public Health. *The State of Missourians' Health, 2005*. Missouri Department of Health and Senior Services, December 2005.

An electronic copy of this report, including a detailed appendix on data used for this report, is available through the DHSS web site (<http://www.dhss.mo.gov/>).

Table of Contents

Executive Summary.....	5
Key Population Health Indicators.....	9
Missouri's Population.....	19
Infants and Children (Age 0-9 Years).....	26
Adolescents (Age 10-17 Years).....	37
Adults (Age 18-64 Years).....	48
Seniors (Age 65 Years and Older).....	66
Infectious Diseases.....	80
Missouri's Health Care System.....	89
Surveillance and Data Gaps.....	104
Appendix. Definitions and Data Sources.....	108
References.....	126



Executive Summary

This State of Missourians' Health Report provides a comprehensive yet concise assessment of the health status of Missouri residents. It highlights the biggest health challenges and opportunities for prevention at each stage of life. Many of the burdens of disease, disability and premature death in our state result from conditions that are preventable. Promoting good health in infancy, childhood and adolescence creates a strong foundation for health throughout the lifespan. Positive changes in health habits, earlier screening and detection of problems, and effective management of chronic conditions can enhance the quality of life at each age.

Key findings of this report include:

Key Population Health Indicators. Of the 10 key population health indicators, Missouri fared better than the U.S. as a whole in three (poverty, child immunization coverage, and health insurance coverage), and worse in seven (infant mortality, life expectancy at birth, life expectancy at 65 years of age, death rate, years of potential life lost, obesity, and smoking).

Population. Between 1994 and 2003, Missouri population grew by 7%. Of all racial and ethnic groups, Hispanics had the fastest growth rate at 77%. The number of Missourians aged 45-64 years increased by 29%.

Health of Infants and Children (0-9 Years of Age)

- In 2003, 93% of Missouri children under 18 years of age had some type of health insurance. This was higher than the national percentage of 89%.

- In 2003, Missouri's infant mortality rate was 7.8 per 1,000 live births. African-American infants were more than twice as likely to die as white infants. For most of the years, the racial gap in infant mortality was larger in Missouri than the nation as a whole.
- Missouri's death rate for children aged 1-9 years is higher than the nation as a whole. Unintentional injuries, birth defects, and homicide are the top three causes of deaths for children. African-American children are at a higher risk of death than white children.
- In 2004, Missouri children 19-35 months of age had the highest immunization coverage rate (86%) ever recorded. The coverage rate is higher than the nation as a whole (83.5%).
- In 2004, over 9,000 child maltreatment cases were substantiated by the Missouri Children's Division. Of those, neglect was the most common problem.
- In 2003, asthma was responsible for 12.3 emergency room visits per 1,000 children aged 0-9 years. African-American children were much more likely to have emergency room visits due to asthma than white children.
- The number of children found with elevated blood lead levels has been declining despite increased testing in Missouri. More than half of the children with elevated blood lead levels were found in St. Louis City.

Health of Missouri's Youths (10-17 Years of Age)

- Missouri youths have a higher death rate than the U.S. as a whole, mainly due to a much higher death

rate from unintentional injuries. Almost half of all deaths among Missouri adolescents are caused by motor vehicle crashes.

- The proportion of Missouri youths who are overweight is growing rapidly. African-American youths are more likely to be overweight than white youths.
- About one in four Missouri adolescents in grades 9-12 currently smoke cigarettes, although the prevalence has been trending slowly downward since 1997. White youths are more likely to smoke than African-American youths.
- Almost a third of Missouri teens in grades 9-12 reported that they drank heavily during the last month, although this figure has declined in recent years. White youths are almost twice as likely as African-American youths to have had heavy drinking during the past month.
- One in five Missouri teens in grades 9-12 use marijuana, and one in ten use inhalant.
- Hospitalizations and emergency room visits for mental disorders among Missouri youths 10-17 years of age have been increasing over the past decade.
- The birth rate among teen girls aged 15-17 years declined by 39% from 1994 to 2003. African-American teens have a considerably higher birth rate than white teens. The racial gap is narrowing.
- About half of Missouri students in grades 9-12 already have had sexual intercourse. This percentage has not declined for a decade, and it is much higher among African-American students than among white students.

Health of Missouri's Adults (18-64 Years of Age)

- In 2003, 15% of Missouri adults had no health insurance.
- Missouri adults 18-64 years of age have a somewhat higher death rate than the U.S. rate. The rate is higher for African-Americans than for whites. Leading causes of death are cancer, heart disease, unintentional injuries, suicide, diabetes, chronic lower respiratory disease, and stroke.
- Almost one in five Missouri adults 21-64 years of age have a disability that limits their normal way of living.
- About 5% of Missouri adults have doctor diagnosed diabetes; this prevalence has increased over the past decade.
- Lung cancer causes more deaths than any other type of cancers among both male and female adults. Of all newly diagnosed cancers (excluding skin cancer), breast cancer is most common among adult women, whereas prostate cancer is most common among adult men.
- Over a quarter of Missouri adults are current smokers. This rate is higher than the U.S. rate, mostly due to the higher rate among Missouri whites than U.S. whites.
- One in four Missouri adults are obese. Missouri's obesity rate is higher than the national rate, and has been on the rise over the past decade.
- Over half of Missouri adults are not getting the recommended amount of moderate or vigorous physical activity. Three out of four Missouri adults

consume less than the recommended five servings per day of fruits and vegetables.

- One in four Missouri adults have doctor-diagnosed arthritis. Women are more likely to have doctor diagnosed arthritis than men.
- Suicide is the fourth leading cause of death among Missourians 18-64 years of age, and mental disorders are the third leading cause of hospitalization in Missouri adults. Drug-induced deaths have increased more than five-fold over the past decade.
- Chlamydia is the most common type of sexually transmitted disease (STD), and it has been on the rise in recent years. Gonorrhea is the second most frequently reported STD. The number of reported syphilis cases in Missouri adults declined dramatically from 1995 to 2001, but it has been rising since 2001. The rate of reported STDs are much higher in African-Americans than in whites.
- In 2003, 121 Missouri adults died of human immunodeficiency virus infection/acquired immunodeficiency syndrome (HIV/AIDS), down from 470 in 1994.

Health of Missouri's Seniors (65 Years of Age and Over)

- The death rate among Missouri seniors is higher than the U.S. rate. Leading causes of death are heart disease, cancer, stroke, chronic lower respiratory disease, pneumonia and influenza, Alzheimer's disease, and diabetes.
- In 2004, 16% of Missouri seniors had doctor diagnosed diabetes.

- About one in 10 Missouri seniors are current smokers. Many seniors are former smokers.
- One in five Missouri seniors are obese, and the prevalence has been on the rise. Obesity prevalence is much higher among African-Americans than among whites.
- Nearly two thirds of Missouri seniors are not getting the recommended amount of moderate or vigorous physical activity. Likewise, over two thirds of seniors consume less than the recommended five servings per day of fruits and vegetables.
- In 2004, 59% of Missouri seniors reported that they had doctor-diagnosed arthritis.
- Of all newly diagnosed cancers (excluding skin cancer), breast cancer is most common among senior women, whereas prostate cancer is most common among senior men.
- Pneumonia and influenza combined is the fifth leading cause of death for Missouri seniors.
- Unintentional injuries are the ninth leading cause of death among Missouri seniors, and the fourth leading cause of hospitalizations. The two most common types of unintentional injuries are falls and motor vehicle crashes.
- About 110,000 Missourians are estimated to have Alzheimer's Disease, which is the sixth leading cause of death.
- Almost half of Missouri seniors have lost six or more teeth. Only about two thirds of seniors had their teeth cleaned by a dentist or dental hygienist in the last year.
- In federal fiscal year 2004, \$1.24 billion was spent to provide care for seniors through the Missouri

Medicaid program, accounting for 25% of the total Medicaid expenditures.

- An estimated \$4.76 billion was spent for Medicare benefit payments in Missouri in federal fiscal year 2001.

Infectious Diseases in Missouri

- Significant progress has been made in controlling infectious diseases during the 20th century through improvements in sanitation and hygiene, use of antibiotics, and universal childhood vaccination. However, major challenges still remain.
- In 2003, leading causes of death due to infectious diseases in Missouri were pneumonia and influenza, septicemia, viral hepatitis, and HIV/AIDS.
- About one in 10 hospitalizations for Missourians are due to infections. The most common infectious causes of hospitalizations are pneumonia, urinary tract infections, and infections of the skin and subcutaneous tissue.
- The most frequently reported infectious diseases in Missouri in 2004 were chlamydia, gonorrhea, laboratory-confirmed influenza, campylobacteriosis, and salmonellosis.
- In 2004, the most reported foodborne diseases in Missouri were campylobacteriosis and salmonellosis.

Missouri's Health Care System

- Missouri has many excellent health care facilities, but not all areas of the state have ready access to such facilities.
- Many areas of Missouri have been designated as

primary care or dental Health Professional Shortage Areas (HPSAs). People who live in these areas do not have optimal access to primary care physician services or dental services.

- The public health system in Missouri consists of DHSS and 114 local public health agencies (LPHAs) in cities and counties throughout the state.
- About 37% of Missouri infants and children under 5 years of age are enrolled in WIC.
- About 16% of all Missourians are enrolled in Medicaid. This percentage varies by counties.

Surveillance and Data Gaps

- Missouri has many good surveillance and data systems that provide valuable information about people's health. However, several key surveillance and data systems need to be strengthened or developed to better assess and monitor the health of Missourians. These include surveillance systems to monitor overweight among children, insurance coverage for children, diabetes, occupational health, environmental health, oral health, and healthcare system.

Key Population Health Indicators

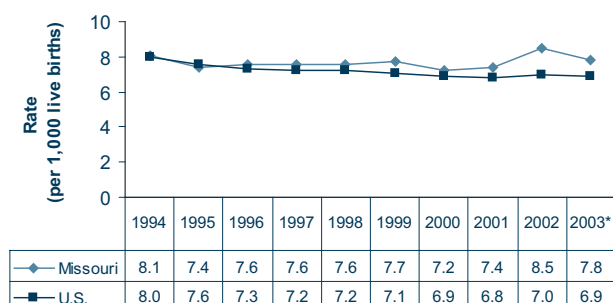
Ten key indicators give us a “snapshot” of Missourians’ health and a way of comparing ourselves with the U.S. as a whole. Of the 10 indicators, Missouri fared better in three (poverty, child immunization coverage, and health insurance coverage), and worse in seven (infant mortality, life expectancy at birth, life expectancy at 65 years of age, death rate, years of potential life lost, obesity, and smoking), compared with the nation as a whole.



Infant Mortality

The infant mortality rate is an important overall health indicator of a population. The death of an infant is also a tragic occurrence. Missouri's overall infant mortality rate (number of deaths divided by the number of live births) has been higher than the national rate since 1996. The Missouri rate trended downward during the 1990's but has increased slightly since 2000 (Figure I-1). In 2003, 599 infants whose mothers lived in Missouri died.¹

Figure I-1. Infant mortality rate, Missouri and the U.S., 1994-2003



Source (Missouri): Missouri Department of Health and Senior Services (DHSS), Missouri Vital Statistics 1994-2003, Table 24

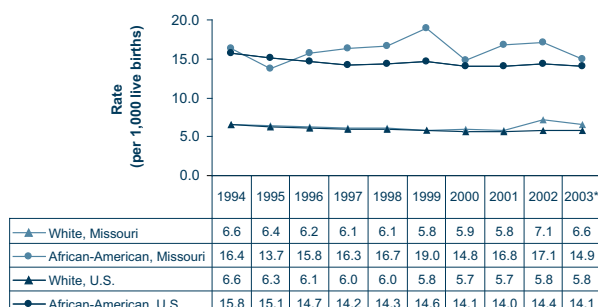
Source (U.S.): Centers for Disease Control and Prevention (CDC), National Center for Health Statistics (NCHS), available at http://www.cdc.gov/nchs/data/nvsr/nvsr53/nvsr53_05.pdf (1994-2002), and http://www.cdc.gov/nchs/data/nvsr/nvsr53/nvsr53_15.pdf (2003)

* Preliminary data for the U.S., 2003

African-American infants are more than twice as likely as white infants to die before their first birthday in both Missouri and the U.S. Since 1996, African-American infants in Missouri have experienced a higher mortality rate than those in the U.S. (Figure I-2).

In 2003, 315 (53%) of the 599 infant deaths in Missouri resulted from problems that occurred before or during birth, or during the first 27 days of life. These problems included complications of pregnancy, labor and delivery; premature birth; disorders of fetal growth; birth trauma; and infections. Congenital anomalies (commonly called birth defects) caused 123 deaths, and Sudden Infant Death Syndrome (SIDS) caused 52 deaths.¹

Figure I-2. Infant mortality rate by race, Missouri and the U.S., 1994-2003



Source (Missouri): DHSS, Missouri Vital Statistics 1994-2003, Table 24

Source (U.S.): CDC, NCHS, available at http://www.cdc.gov/nchs/data/nvsr/nvsr53/nvsr53_05.pdf (1994-2002), and http://www.cdc.gov/nchs/data/nvsr/nvsr53/nvsr53_15.pdf (2003)

* Preliminary data for the U.S., 2003

Life Expectancy

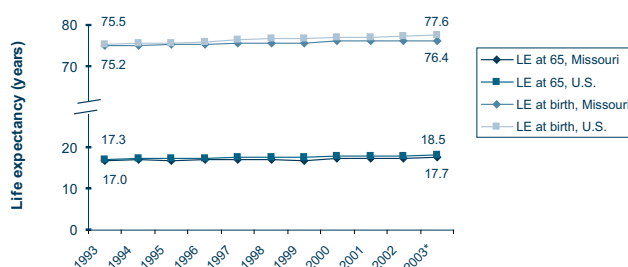
Life expectancy has increased gradually during the last decade, in both Missouri and the nation. Missouri babies born in 2004 are expected to live for 76.8 years.² The 2003 life expectancy for Missourians (76.4 years) is approximately a year shorter than all U.S. residents (77.6 years) (Figure I-3).

In 2003, Missourians who have attained the milestone of their 65th birthday can expect to live 17.7 more years (to 82.7 years), whereas nationally this number is 18.5 more years (to age 83.5) (Figure I-3). The 2004 life

expectancy at the age of 65 for Missourians increased to 18 years.² The gap between Missouri and the U.S. has been widening since 1993, as the life expectancy for U.S. seniors increased faster than Missouri seniors during that time (Figure I-3).

Women enjoy greater longevity than men, regardless of race. Missouri African-Americans have considerably shorter life expectancy than whites for both sexes (by 7.3 years for men and 4.3 years for women in 2000), although this racial gap in life expectancy has narrowed in recent years (Figure I-4).

Figure I-3. Life expectancy (LE) at birth, and at age of 65 years, Missouri and the U.S., 1993-2003

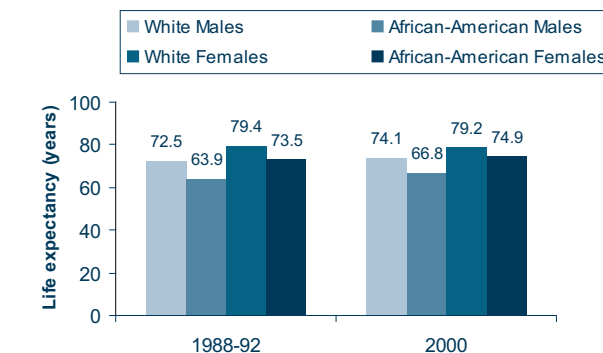


Source (Missouri): DHSS, Missouri Vital Statistics Report 1994-2003, Table 29

Source (U.S.): CDC, NCHS, available at http://www.cdc.gov/nchs/data/nvsr/nvsr53/nvsr53_05.pdf (1994-2002), and http://www.cdc.gov/nchs/data/nvsr/nvsr53/nvsr53_15.pdf (2003)

* Preliminary data for the U.S., 2003

Figure I-4. Life expectancy at birth by race and sex, Missouri residents, 1988-92 and 2000



Source: DHSS, Health Statistics

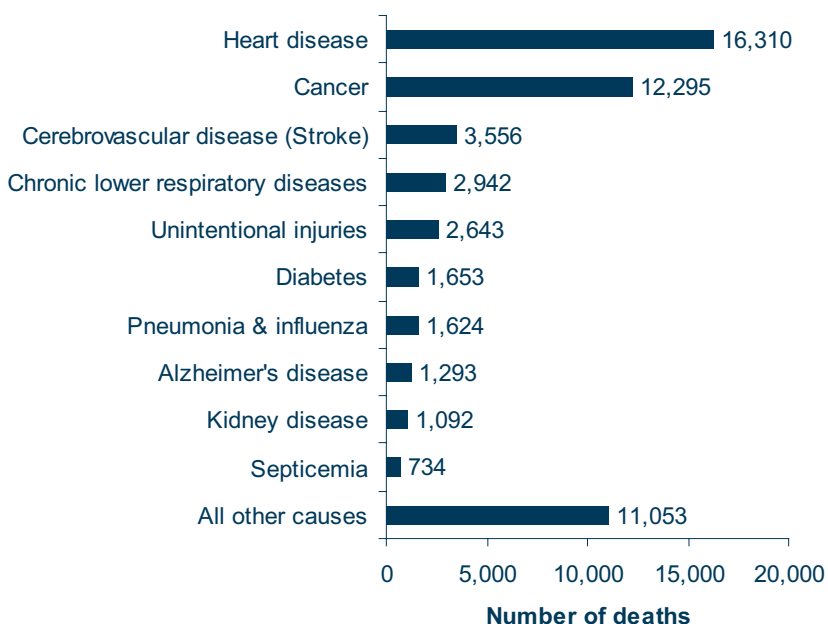
Overall Death Rate and Leading Causes of Death

In 2003, 55,195 Missourians died. Over half of these deaths were caused by heart disease (29.5%) and cancer (22.3%). Other major causes included stroke, chronic lower respiratory tract diseases, diabetes, and unintentional injuries (including motor vehicle and other accidents) (Figure I-5).

Compared with U.S. figures, Missouri's overall age-adjusted death rate in 2002 (912 per 100,000 people³) was higher than the nation as a whole (845 per 100,000⁴). Missouri's rates for most of the leading causes of death, including heart disease, cancer, stroke, chronic lower respiratory tract disease, diabetes, and unintentional injuries, were higher than the national rates.^{3, 4}

As with most of the key health indicators, African-Americans fare worse than whites. In 2003, the overall age-adjusted death rate for Missouri African-Americans was 1,152 per 100,000, compared with 874 per 100,000 for whites. The top three causes of death were the same for both races: heart disease, cancer, and stroke. The order of the other leading causes of death differs somewhat. For example, homicide and septicemia were among the top ten causes only for African-Americans, and Alzheimer's disease and suicide were in the top ten only for whites.

Figure I-5. Leading causes of deaths, Missouri residents, 2003

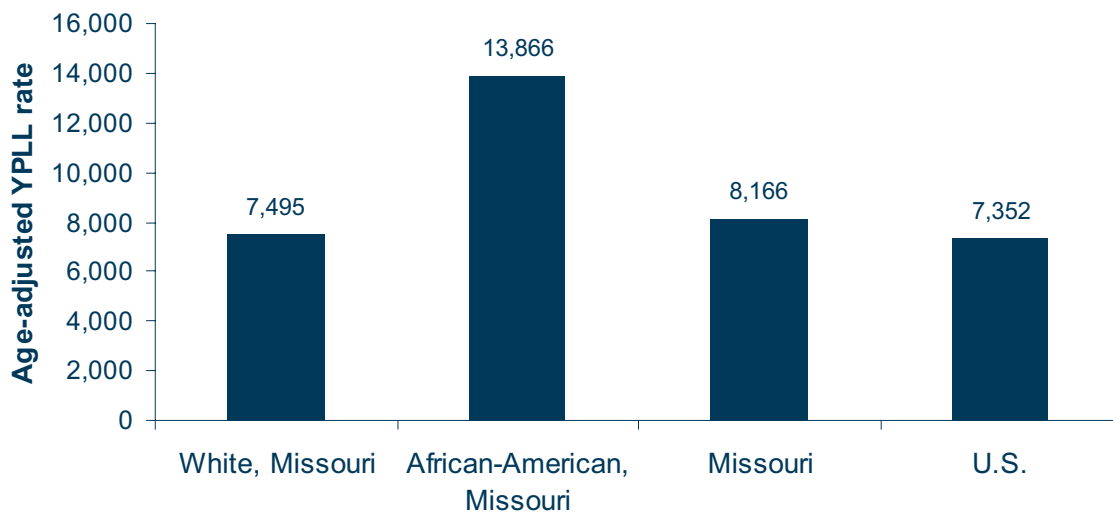


Source: DHSS, MICA (Missouri Information for Community Assessment) Death, available at <http://www.dhss.mo.gov/DeathMICA/index.html>

Years of Potential Life Lost (YPLL)

One measure of the impact of premature death is Years of Potential Life Lost (YPLL). YPLL is a count of the number of potential years lost to each person who has died before the age of 75, which is then expressed as a rate. In 2002, there were 8,166 years of potential life lost for every 100,000 Missouri residents. This is higher than the U.S. rate of 7,352 YPLL per 100,000 people. Missouri African-Americans (13,866 YPLL) had a higher rate than whites (7,495 YPLL) (Figure I-6).

Figure I-6. Age-adjusted YPLL rate* (per 100,000 population less than 75 years of age), Missouri and the U.S., 2002



Source: CDC, National Center for Injury Prevention and Control, available at <http://webapp.cdc.gov/sasweb/ncipc/ypll10.html>

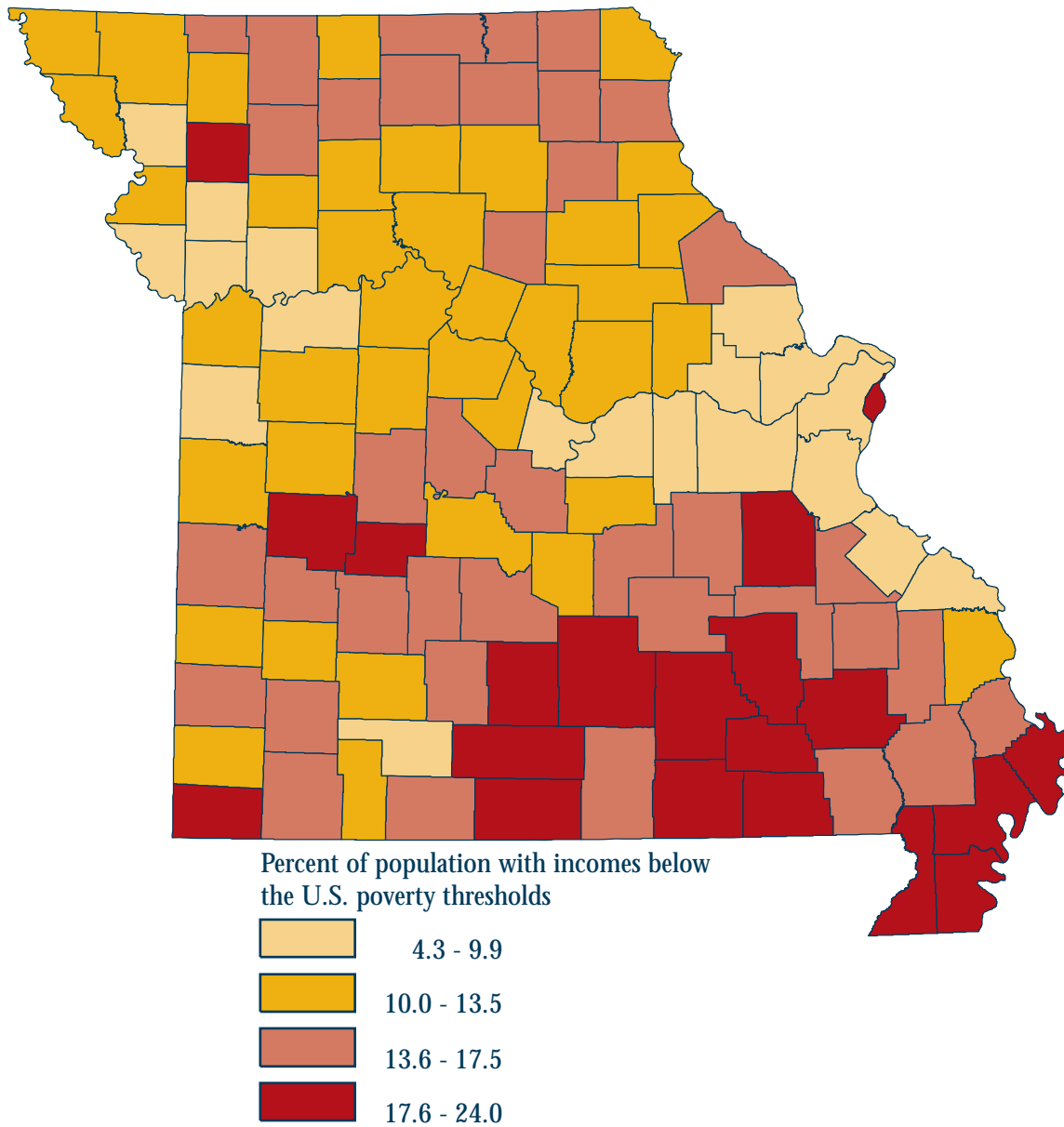
* Age adjustment using 2000 U.S. population

Poverty

The rate of poverty in a population is an important indicator of health, because poor people are more likely to have health problems. Poverty level is defined based on the number of people living in a household. For example, the 2003 federal poverty threshold for a family of one adult under 65 years old is annual income of \$9,573. For a family of two adults and two children it is \$18,660.⁵ The U.S. Census Bureau reports that in 2003 there were 602,000 Missourians living below the poverty level, or 10.7% of the total population. This is lower than the national figure of 12.5%.⁶ However, poverty is distributed very unevenly within the state. In 2002, poverty rates ranged from only 4.3% in St. Charles County to 24% in Pemiscot County (Figure I-7). Overall, the 2003 poverty rate is almost twice as high among Missouri African-Americans (18.7%) as among whites (9.9%).⁷



Figure I-7. Estimated poverty rate (%) by county, Missouri, 2002

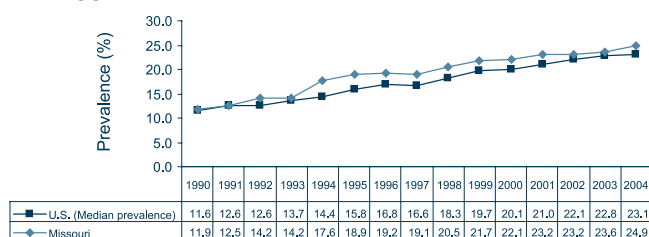


Source: U.S. Census Bureau, Housing and Household Economic Statistics Division, Small Area Estimates Branch, available at <http://www.census.gov/hhes/www/saie/county.html>

Obesity

Obesity is on the rise in Missouri, and contributes to serious health problems, including heart disease and stroke, two of the leading causes of death. Being overweight or obese also increases the risk of hypertension, high blood cholesterol, diabetes, and many other diseases and conditions. The prevalence of obesity among Missouri adults has more than doubled since 1990, consistent with the national trend (Figure I-8). Obesity is defined according to body mass index (BMI), which is a person's weight (in kilograms) divided by his or her height (in meters) squared. For example, a person who weighs 203 pounds (92 kilograms) and is 5'9" tall (1.75 meters) has a BMI of 30.0. A person with a BMI of 30.0 or more is considered to be obese. In 2004, Missouri's obesity rate was 24.9% among adults 18 years old and older, which is slightly higher than the U.S. rate of 23.2% (Figure I-8). Missouri African-Americans have a higher rate of obesity than whites (38.9% vs. 23.6% in 2004).⁸

Figure I-8. Prevalence of obesity* among adults 18 years and older, Missouri and the U.S., 1990-2004



Source: CDC, Behavioral Risk Factor Surveillance System (BRFSS) Online Prevalence Data, available at <http://apps.nccd.cdc.gov/brfss/>

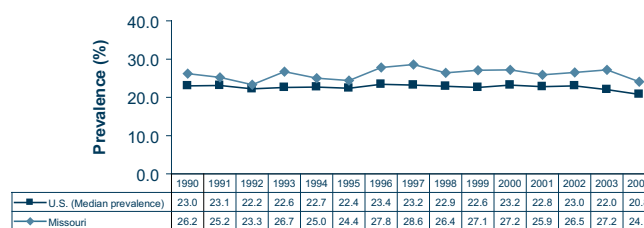
* Body Mass Index (BMI) of 30 or more

Tobacco Use

Smoking damages nearly every organ in the human body, causing many diseases and harming the user's general health. It damages the immune system and increases the risk of infections. Smokers are much more likely to suffer from coronary heart disease, the leading cause of death in Missouri and the U.S. Smoking also causes many types of cancer, most notably lung cancer.⁹ Smoking is estimated to be responsible for one of every five deaths in Missouri.²

The proportion of Missourians who are current smokers is higher than that is the U.S., and has been consistently higher since at least 1990. In 2004, 24.1% of Missouri adults 18 years and older smoked cigarettes, compared with 20.8% nationally (Figure I-9).

Figure I-9. Prevalence of current smokers* among adults 18 years and older, Missouri and the U.S., 1990-2004



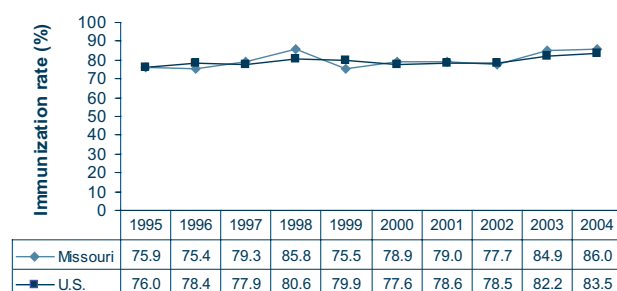
Source: CDC, BRFSS Online Prevalence Data, available at <http://apps.nccd.cdc.gov/brfss/>

* All respondents who have ever smoked 100 cigarettes in their lifetime and reported smoking every day or some days.

Childhood Immunization Coverage

Immunization helps protect young children in Missouri against potentially deadly childhood diseases. In 2004, 86% of Missouri children between the ages of 19 and 35 months had received their basic immunization series against diphtheria, tetanus, pertussis, polio, measles, mumps and rubella (Figure I-10). This is slightly higher than the national rate of 84%, and is the highest level ever recorded in Missouri, surpassing the previous high of 81% in 1998.

Figure I-10. Estimated vaccination coverage for the 4:3:1* vaccination series among children 19-35 months of age, Missouri and the U.S., 1995-2004



Source: National Immunization Program, National Immunization Survey, available at <http://www.cdc.gov/nip/coverage/default.htm>

* Four or more doses of diphtheria and tetanus toxoids and pertussis vaccines, or diphtheria and tetanus toxoids (DTP/DT/DTaP), three or more doses of poliovirus vaccine, and one or more doses of any measles-containing vaccine (MCV).



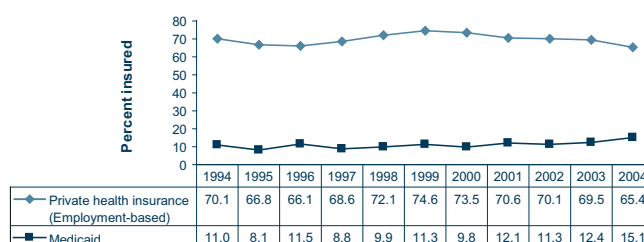
Health Insurance Coverage

Health insurance coverage is important to maintaining health. Uninsured adults and children are less likely to receive preventive health services and often delay seeking medical care when they are sick. As a result, many serious medical conditions are identified late and are more costly to treat. Uninsured people have higher rates of avoidable hospitalizations and emergency room use.^{10, 11}

According to the 2005 Current Population Survey, 13% of Missourians had no health insurance coverage for 2004, compared with 16% nationally. The rate was 14% for people under 65 years of age, compared with 18% nationally.¹² A higher percentage of African-Americans in Missouri (21%) have no health insurance coverage, compared with whites (11%).⁷

Most Missourians receive their health care coverage through private health insurance provided through an employer or union. In 2004, 65% of Missourians under 65 years of age were covered this way (Figure I-11). Only 8% purchased individual insurance. Government health care plans (Medicaid, Medicare, or military health care) covered 19% of Missourians under age 65, including 15% covered by Medicaid (Figure I-11). All these figures reflect coverage for at least part of the year.¹² (Note: People can be covered by more than one type of health insurance during the year.)

Figure I-11. Health insurance coverage status among people under 65 years of age, Missouri, 1994-2004



Source: U.S. Census Bureau, Current Population Survey, Annual Social and Economic Supplement, available at <http://www.census.gov/hhes/www/hlthins/historic/index.html>

Missouri's Population

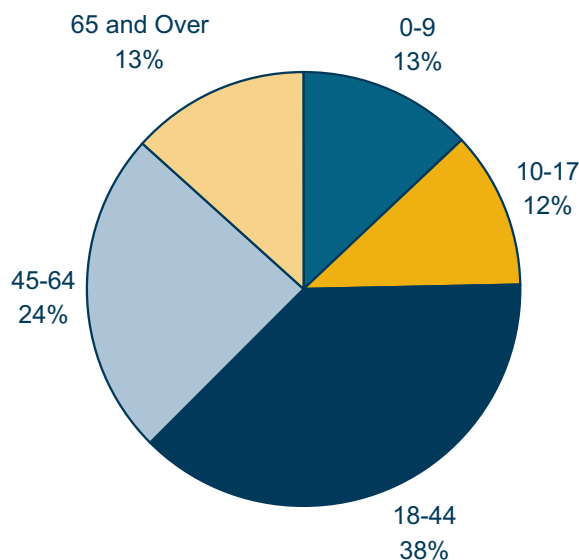
To understand the state of Missourians' health, it is helpful to have some basic facts about the people who live here. Health status is related to many demographic factors, including age, race, ethnicity, educational attainment and socioeconomic status. Who we are affects how healthy we are as a group.



Age

According to the U.S. Census 2003 population estimates, Missouri has 5,704,000 residents, representing about 2% of the U.S. population. About 38% (2,165,000) of Missourians are adults aged 18-44 years; an additional 24% (1,372,000) are older adults aged 45-64 years. Together, these two age groups make up 62% of the population. The age distribution of Missouri's population is shown in Figure II-1. It is very similar to the U.S. as a whole, although Missouri has a slightly higher proportion of people 65 years and older (13.3% for MO¹ vs. 12.4% for U.S.²).

Figure II-1. Missouri population estimates by age (years), 2003



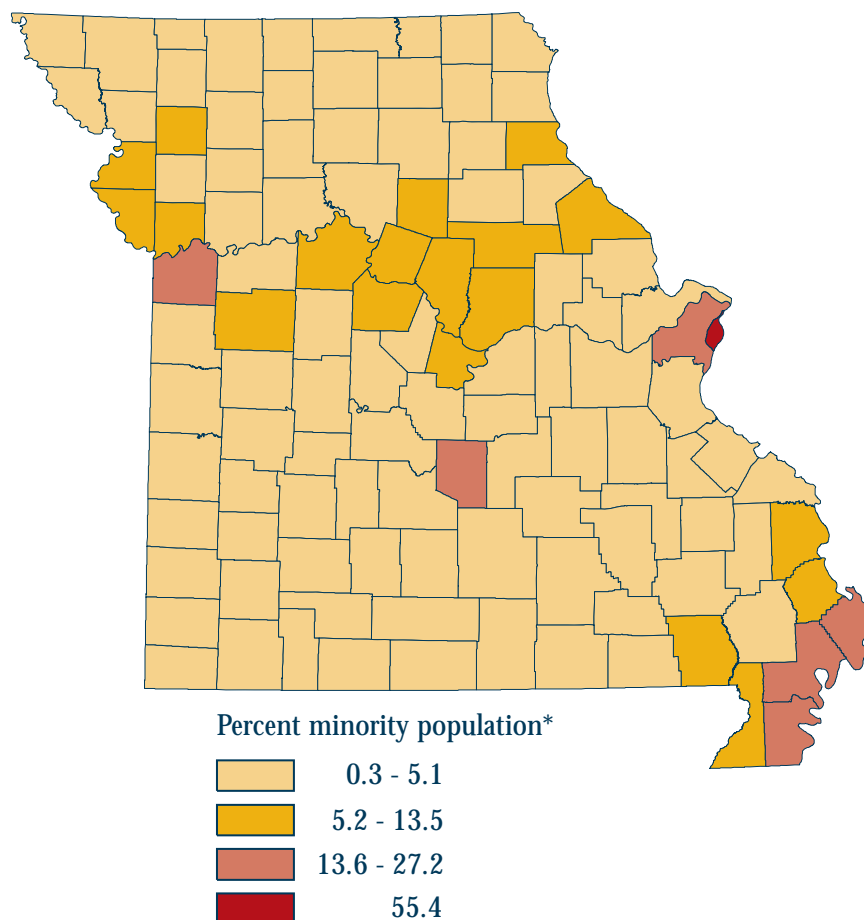
Source: Missouri Department of Health and Senior Services (DHSS), MICA (Missouri Information for Community Assessment) Population, available at <http://www.dhss.mo.gov/PopulationMICA/>

Race

Racial minorities make up a somewhat smaller proportion of Missouri's population than of the U.S. as a whole. In 2003, 11.9% of Missourians were African-American and 2.1% were of other races.¹ In the U.S., these figures were 13.1% and 5.6% respectively.² The

proportion of minorities varies widely in different areas of the state, from as low as 0.3% in Putnam County to 55.4% in St. Louis City (Figure II-2).

Figure II-2. Minority population (%) by county, Missouri, 2003



Source: National Center for Health Statistics and Missouri Department of Health and Senior Services, Health Statistics

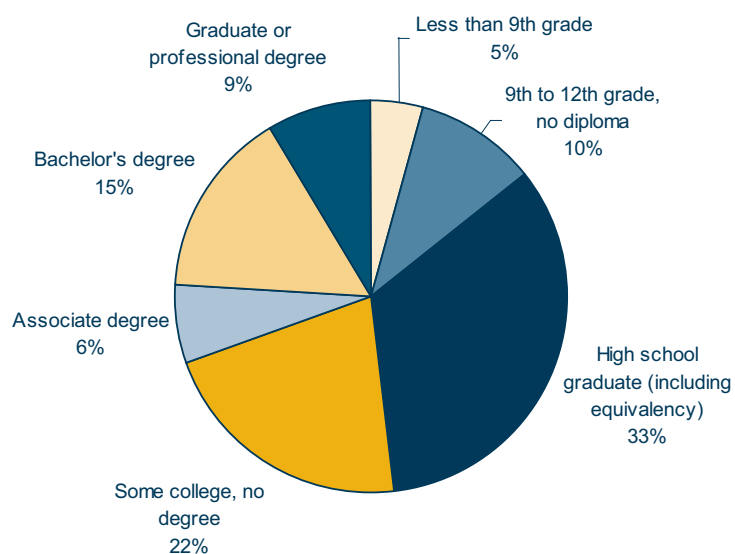
*Minority population defined as all non-white persons.

Education

Another factor that influences health is educational attainment, shown in Figure II-3. The proportion of Missourians who are high school graduates or higher is 85.4%, compared with 83.6% nationally. However, the proportion of people who have completed a bachelor's degree or higher is somewhat lower in Missouri, 24.1% compared with 26.5%.

Like most characteristics, educational levels vary in different areas of Missouri, shown in Figure II-4. There is a cluster of 13 counties in southeastern Missouri where almost a third of the population have not graduated from high school. Elsewhere in the state, the urban areas and those counties with universities tend to have more highly educated residents.

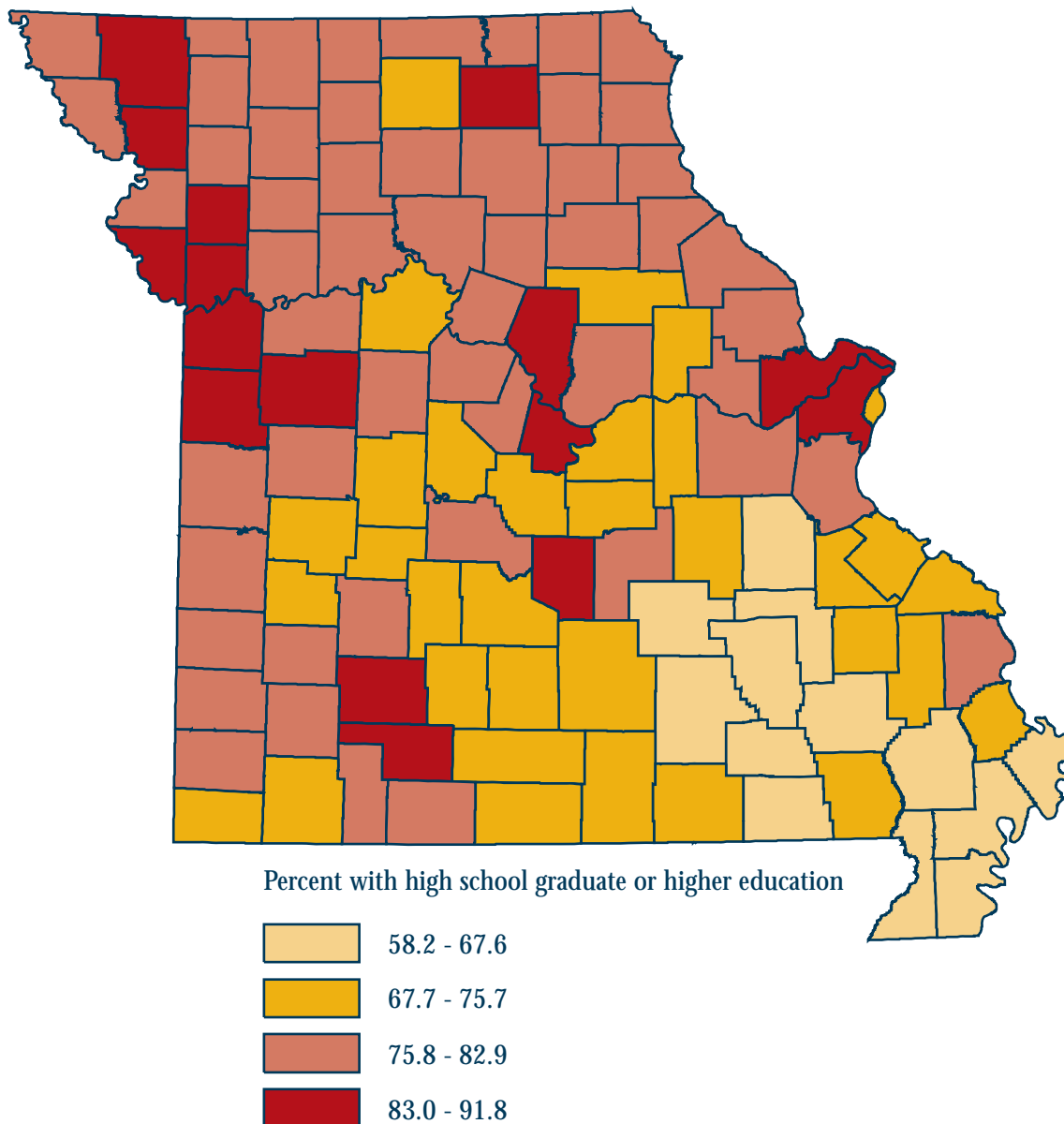
Figure II-3. Educational attainment among Missouri populations 25 years and over, 2003*



Source: U.S. Census Bureau, 2003 American Community Survey, Summary Table PCT034, available at http://factfinder.census.gov/servlet/DTSUBJECTServlet?_ts=146051964687

NOTE: The American Community Survey excludes persons living in group quarters (college dorms, military barracks, prisons and other institutions).

Figure II-4. Persons with high school graduate or higher education (%) among Missourians aged 25 years and over, by county, 2000



Source: U.S. Census 2000 Summary File 3 (SF 3) - Sample Data, Table QT-P20, available at http://factfinder.census.gov/servlet/QTSubjectShowTablesServlet?_ts=146048730828

Household Income

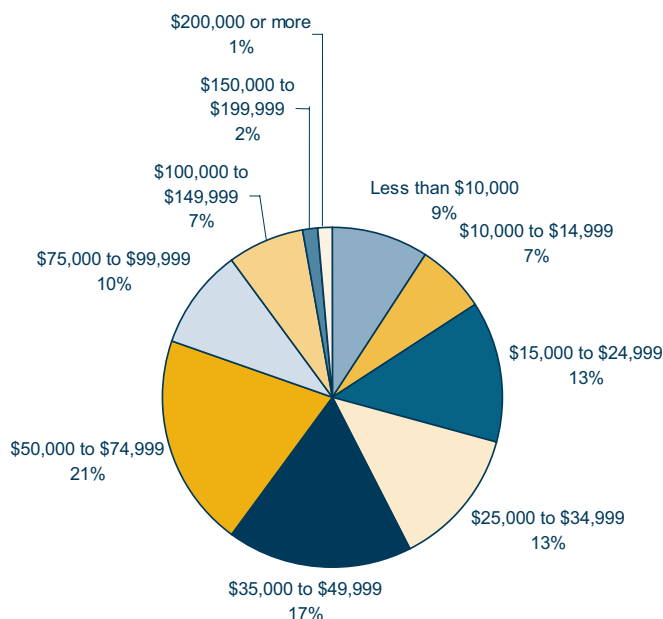
Socioeconomic status is an important factor for a population's health. The distribution of annual household income and benefits in Missouri in 2003 is shown in Figure II-5. A little more than half of households received incomes and benefits of \$25,000-\$74,999 during the year prior to the survey. An additional 29% of households made less than \$25,000, and 20% made \$75,000 or more.

Note: Income and benefits include: wage or salary income; net self-employment income; interest, dividends, or net rental or royalty income or income from estates and trusts; Social Security or railroad

retirement income; Supplemental Security Income (SSI); public assistance or welfare payments; retirement, survivor, or disability pensions; and all other income.³

Missouri's median household income and benefits is lower than the U.S. median (\$40,725 vs. \$43,564). The median is the midpoint, so half of Missouri households make less than \$40,725 and half make more than that amount. The discrepancy in the average (mean) household income and benefits is even larger, with the Missouri average at \$51,324 compared with the U.S. at \$58,036. The proportion of Missouri households with incomes/benefits of \$75,000 or more, 20%, is lower than the national figure of 25%.⁴

**Figure II-5. Percentages of households by annual household income and benefits in Missouri, 2003
(in 2003 inflation-adjusted dollars)**



Source: U.S. Census Bureau, 2003 American Community Survey, Summary Table P069, available at http://factfinder.census.gov/servlet/DTSUBJECTKEYWORDSERVLET?_ts=146054116859

Notable Population Trends

Trends over the past decade show that Missouri's population is changing in four important ways:

- Growth. Missouri population grew by 7% between 1994 and 2003, slower than the national growth rate of 11%.
- Increase in minorities. Missouri's African-American population grew 15% between 1994 and 2003, while other non-white races grew 50%. The Hispanic population grew 77%, the fastest growth rate of any group. In comparison, these figures were 15%, 41%, and 48%, respectively, for the U.S.^{1, 2}
- Aging "Baby Boomers." The number of Missourians who are 45-64 years old increased by 29% between 1994 and 2003, the greatest increase among all age groups. In contrast, the number 18-44 years old grew by less than 2%.^{1, 2}
- Growing senior population. The proportion of people aged 65 and older in Missouri grew from 8.6% in 1940⁵ to 13.3% in 2003¹ – a 54.7% increase. By 2030, this proportion is expected to double from now.⁶ While we celebrate the success of public health in contributing to increased life expectancy, the growing senior population presents significant medical, social and public health challenges.



Infants and Children (Age 0-9 Years)

The foundation for health is laid during a child's earliest years. The health of infants and children sets the stage not only for their health as adults but also for the health of future generations. To reach their potential, they need healthy environments (at home and in their communities), adequate health care, proper nutrition, physical activity, and protection from injuries.

In 2003, there were about 750,000 infants and children under 10 living in Missouri, making up 13% of the population.¹ The exact percentage of these children who have health insurance coverage is not known, but 93% of Missouri children under 18 had some type of health insurance in 2003. Most (71%) of Missouri children under 18 years of age were covered by private health insurance (including employment-based and directly purchased); 27% were covered by Medicaid. In comparison, nationally these figures were 89%, 66%, and 26%, respectively. (Note: People can be covered by more than one type of health insurance during the year.)²

While most children live with two parents (or step-parents), a significant number live with their mothers only. In 2003, 69% of the family households in Missouri with children under 18 were married couples and 23% were female single parents. This is very close to the national figures of 70% and 24%. The remaining 8% of Missouri family households with children under 18 were single male householders.³



Mortality and Leading Causes of Death

By far the most vulnerable period in a child's life is the first year. In 2003, 599 Missouri infants whose mothers lived in Missouri died before the age of one. The infant mortality rate (7.8 per 1,000 live births) is 33 times higher than the death rate for children 1-9 years old.^{4, 5}

More than half of Missouri infant deaths in 2003 (315 infants) resulted from problems that occurred before or during birth, or during the first 27 days of life, such as complications of pregnancy, labor and delivery, premature birth, disorders of fetal growth, birth trauma, infections.⁵

Congenital anomalies (commonly called birth defects) caused an additional 123 deaths, and Sudden Infant Death Syndrome (SIDS) caused 52 deaths.⁵ SIDS deaths accounted for 27% of infant deaths after the first 27 days of life in 2003.⁴

African-American infants are more than twice as likely as white infants to die before their first birthday. In 2003, the death rate (per 1000 live births) for African-American infants was 14.9, compared with 6.6 for white infants.⁵

Death is relatively rare among children in this country. Only 157 Missouri children age 1-9 years died in 2003. Unintentional injuries are by far the leading cause of death in this age group, with 64 deaths in 2003. Half of these deaths (32) resulted from motor vehicle crashes. Congenital anomalies (birth defects) were the second leading cause, with 20 deaths. Sadly, homicide was third, with 12 deaths in 2003.⁴

Missouri's all-cause death rate for children 1-9 years of age is higher than that for the U.S. as a whole. In 2002, Missouri's rate (per 100,000) was 25.7,⁴ compared with 22.2 nationally.^{6, 7} Rates for all three leading causes mentioned above were slightly higher in Missouri than in the U.S.^{4, 6, 7}

As in infancy, African-American children are at higher risk of death during childhood. In 2003, the overall mortality rate for African-Americans age 1-9 was 34.7 per 100,000, compared with 20.6 per 100,000 for whites.⁴

Health-Related Problems and Potential Opportunities for Prevention

Low birth weight and very low birth weight

Low birth weight (LBW) is the most important factor in infant deaths during the neonatal period (birth through the first 27 days of life). It also affects the rate of infant mortality after the neonatal period. LBW is defined as a weight of less than 2,500 grams (about 5 pounds, 9 ounces) at birth. Very low birth weight (VLBW) is defined as a weight of less than 1,500 grams (about 3 pounds, 5 ounces).

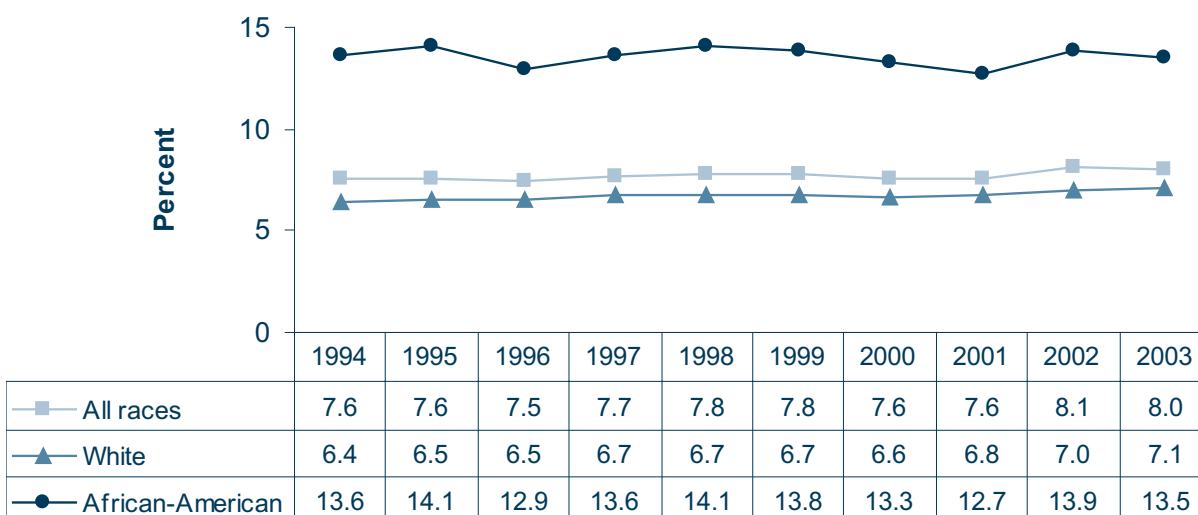
In 2003, 8% of Missouri resident babies were born with LBW, and 1.6% were born with VLBW.⁸ These figures are very close to the 2003 national rates of 7.9% and 1.4%.⁹ There has been a small but steady upward trend in these rates over the last decade. This is probably due to the increase in preterm delivery, changes in obstetrical

practices, induction of labor, an increase in the number of multiple births (twins, triplets, etc.) that result from assisted reproductive technology, and other factors.¹⁰

The difference in the rates of low birth weight by race is striking. The rate of LBW among infants of African-American mothers was 13.5% in 2003, compared with 7.1% in infants of white mothers (Figure III-1).

VLBW showed the same pattern as LBW, with a 2003 rate of 3.5% in African-Americans compared with 1.3% in whites in Missouri.⁸ The reasons for the higher rate of LBW and VLBW among African-Americans are not all clear. Some, but not all, of the disparity can be explained by differences in risk factors such as the mother's age, education and income. There may also be racial differences in mothers' medical condition, stress,

Figure III-1. Percent of Low Birth Weight (LBW) by race of mother among resident live births, Missouri, 1994-2003



Source: Missouri Department of Health and Senior Services (DHSS). Missouri Vital Statistics 1994-2003, Table 8

lack of social support, bacterial vaginosis, previous preterm delivery, and maternal health status and history.¹⁰

What can be done to reduce the number of babies born too small?

- Reduce teen pregnancies.
- Improve women's health before they get pregnant.
- Provide interventions to help women stop smoking, alcohol and drug use during pregnancy.
- Refine assisted reproductive technology techniques.
- Avoid unnecessary medical induction of labor

Many other interventions have been and are being tested, but they have not been clearly shown to prevent LBW or pre-term birth.

Inadequate prenatal care

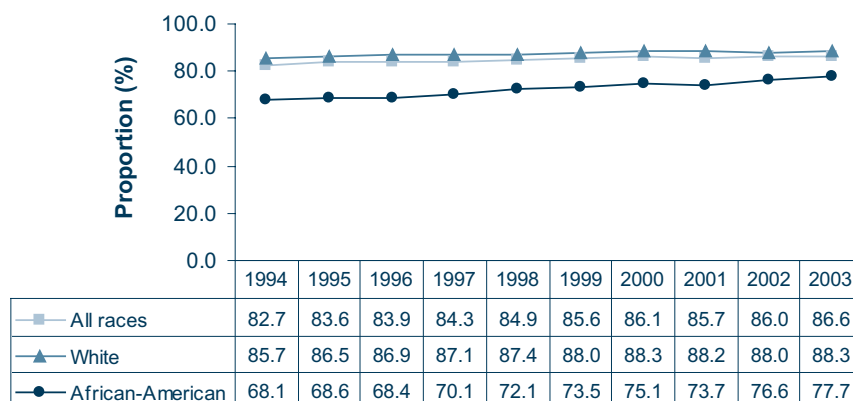
Prenatal care is important for a healthy pregnancy and

birth. Early prenatal care can help reduce illness, disability and death during the first month of the baby's life. Healthcare providers give advice to expectant mothers and identify and manage any health problems they may have.

Babies born to mothers who received no prenatal care are three times more likely to be born at low birth weight, and five times more likely to die, than those whose mothers received prenatal care.¹¹

The proportion of Missouri infants whose mothers receive early prenatal care has been gradually rising over the past decade. In 1994, 83% of infants were born to mothers who received care in the first trimester; by 2003 that figure had risen to 87%. The proportion among African-Americans is unfortunately much lower, but has increased from 68% in 1994 to 78% in 2003, and the gap between whites and African Americans has become smaller (Figure III-2).

Figure III-2. Proportion of live births whose mothers began receiving prenatal care in the first trimester, Missouri, 1994-2003



Source: DHSS, MICA (Missouri Information for Community Assessment) Births, available at <http://www.dhss.mo.gov/BirthMICA/index.html>

The proportion of Hispanic infants whose mothers received prenatal care in the first trimester is also low, but has increased from 74% in 1994 to 80% in 2003.¹²

The proportion of infants born to women who do not receive prenatal care until the third trimester, or who get no care at all, also varies with race and ethnicity. In 2003, the rate of late or no care in Missouri was 2.1% overall (1.7% among whites, 4.2% among African-Americans, and 3.7% among Hispanics).¹²

Prenatal care in Missouri compares favorably with the U.S. as a whole. In 2003, 87% of Missouri infants were born to mothers who had early care, compared with 84% for U.S. infants. Conversely, the percentages of infants whose mothers had late care were 2.1% for Missouri and 3.5% for the U.S.^{9, 12}

What can be done to increase the number of mothers receiving early, adequate prenatal care?

- Improve women's access to insurance coverage and to health care providers;
- Make sure that women who become eligible for Medicaid when they get pregnant can be enrolled and see a health care provider quickly;
- Improve outreach to women who do not seek early prenatal care;
- Educate and encourage prenatal care providers to provide the whole range of services needed, including: appropriate counseling on smoking, alcohol and drug use; screenings for diseases and risk factors; breastfeeding education; and nutrition information including folic acid supplementation.

Motor vehicle fatalities

Motor vehicle crashes are the leading cause of death for children in the U.S. and Missouri. Nationwide, four children die and more than 600 are injured every day. More than half of the children who were fatally injured in 2003 were unrestrained, that is, not using a child safety seat, booster seat or seat belt. Among children 0-4 years of age who died, 35% were unrestrained.¹³ Another major contributor to this problem is drinking and driving. Nationally, one quarter of all motor vehicle deaths among children under age 15 involve a drunken driver.

What can be done to decrease the number of children killed in motor vehicle crashes? Several approaches have been shown to work, including:

- Child safety seat distribution programs that provide free loaner seats, low-cost rentals, or direct giveaways along with education about using them;
- Strict child safety seat laws;
- Programs that provide community-wide information and enforcement for the use of child safety seats;
- Education, law enforcement and treatment programs that reduce drinking and driving.

Vaccine-preventable diseases

Vaccines offer safe and effective protection from infectious diseases. By making sure children are up-to-date on the recommended vaccines, parents can protect

their children, friends and communities from serious, life-threatening infections.

The use of vaccines has eradicated smallpox, eliminated wild poliovirus in the U.S. and significantly reduced many other diseases. However, the viruses and bacteria that cause vaccine-preventable diseases still exist. They can be passed on to people who are not protected. These diseases have many social and economic costs: missed school days, missed parental work time, hospitalizations and even deaths. Immunization is one of the most cost-effective public health measures available.

Most young children in Missouri are protected against vaccine-preventable diseases. In 2004, 86% of Missouri children between the ages of 19 and 35 months had received their basic immunization series against diphtheria, tetanus, pertussis, polio, measles, mumps and rubella. This is higher than the national rate of 83.5%, and is the highest level ever recorded in Missouri.¹⁴

Unfortunately, many children are still at risk for vaccine-preventable diseases. In 2004, 293 children aged 0-9 years had vaccine-preventable diseases reported to DHSS, not counting influenza, varicella (chickenpox), and haemophilus influenzae type b (Hib). That was the most reported in a decade.¹⁵ (Influenza is reported seasonally; varicella data is only available for all ages in aggregated form; and Hib is not reported individually.) In addition, 1,992 laboratory-confirmed influenza cases were reported among children aged 0-14 years in Missouri during the 2004-05 influenza season, which begins in early October (Week 40) of one calendar year and ends in late May (Week 20) of the next calendar year.¹⁵

In 2003, 1,086 hospitalizations of Missouri children

aged 0-9 years occurred due to diseases that could have been prevented by immunization. This was more than twice the number in 2002.⁴ On average, two children aged 0-9 years have died each year during 1994-2003 from vaccine-preventable diseases. However, in 2003, six children died.⁴

What can be done to increase the number of children who receive all the recommended immunizations?

- Continue to educate parents about the benefits of immunization and the risks of vaccine-preventable diseases;
- Assure that vaccines are widely available from healthcare providers;
- Educate and encourage healthcare providers to implement patient reminder/recall systems and use every opportunity to appropriately immunize children.

Violence

Child maltreatment is a serious problem in Missouri and the U.S. The costs and consequences of child maltreatment are high. Children who are maltreated are at higher risk for many health and social problems, including injuries, smoking, alcoholism, drug abuse, eating disorders, severe obesity, depression, suicide, and sexual promiscuity.

Maltreatment of infants and young children can cause important regions of the brain to form improperly, leading to physical, mental and emotional problems. Children who are assaulted by their caregivers are more likely to be physically assaulted as adults, and to victimize their own children.¹⁶

It is difficult to know the exact scope of this problem since it is under-reported. In 2004, 9,262 child maltreatment cases were substantiated by the Missouri Children's Division. Among those cases, neglect was the most common problem (47%), followed by physical abuse (25%), sexual abuse (23%) and emotional maltreatment (6%).¹⁷ There is no good way to compare this with national data because the definitions and reporting systems vary from state to state.

As previously noted, 12 children aged 1-9 years were victims of homicide in Missouri in 2003. Data from hospitals give us another way to measure the impact of child maltreatment in Missouri. In 2003, 567 emergency room visits and hospital admissions were identified as being due to child abuse, neglect or rape of children under age 10 in Missouri. This number has fluctuated between 560 and 760 during 1994-2003.¹⁸ African-American children are more than three times as

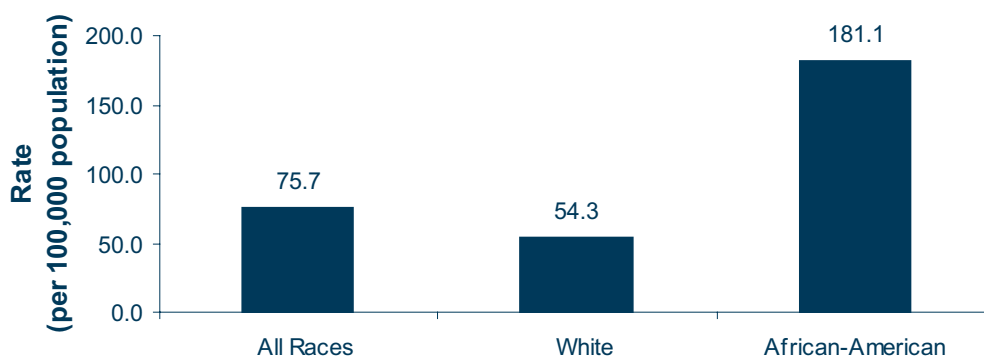
likely to have such emergency room visits and hospitalizations than white children (Figure III-3).

What can be done to decrease the number of children subjected to violence?

The following interventions focusing on improving protective factors have been suggested to be effective:^{19, 20}

- Supportive, stable family environments;
- Nurturing parenting skills;
- Parental employment;
- Adequate housing;
- Access to health care and social services;
- Communities that support parenting and take responsibility for preventing abuse;

Figure III-3. Rate of emergency room visits and hospitalizations due to injuries resulted from abuse, neglect, or rape among children aged 0-9 years, by race, Missouri residents, 2003



Source: DHSS, MICA Injury, MICA population, available at <http://www.dhss.mo.gov/MICA/>

- Interventions and community supports focusing on reducing inter-partner violence.

Asthma

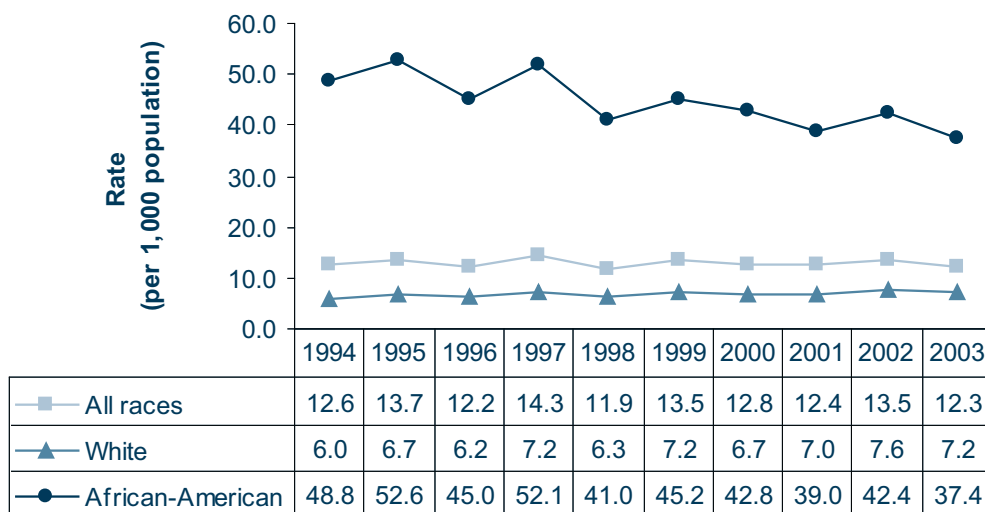
Asthma is the most common chronic disease of childhood. It is also a leading cause of disability, and the third-leading cause of hospitalization for U.S. children.²¹ Children with asthma frequently miss school. The proportion of U.S. children who suffer from asthma has increased significantly since 1980.²¹

A statewide health survey conducted by DHSS in 2004 showed that 16% of Missouri adults with children

under age 18 said they had one or more asthmatic children.²²

Asthma can be difficult to control, especially if families do not have access to continuous, comprehensive, coordinated care. The lung spasms and loss of breath, if not controlled, can be fatal. Many children are taken to emergency rooms for treatment of asthma. During 2003, 9,220 emergency room visits, or 12.3 visits per 1,000 Missouri children aged 0-9 years, were due to asthma. Asthma ER visits have remained relatively steady for the last 10 years. ER visits were much more likely for African-American children than for white children (Figure III-4).

Figure III-4. Rate of asthma ER visits among infants and children 0-9 years of age, by race, Missouri residents, 1994-2003



Source: DHSS, MICA Emergency Room, MICA Population, available at <http://www.dhss.mo.gov/MICA/>

What can be done to decrease the impact of asthma on Missouri's children and reduce emergency care for asthma attacks? Currently, there are no preventive measures or cure for asthma, so the focus must be on measures to control it, such as:²³

- Proper diagnosis and medication;
- Avoiding contact with environmental "triggers". Environmental triggers include cockroaches, dust mites, furry pets, mold, tobacco smoke, and certain chemicals;
- Programs that train children to improve their asthma control compliance, and that assist schools in helping children control asthma. These programs are being implemented and evaluated in several states.²³

Lead poisoning

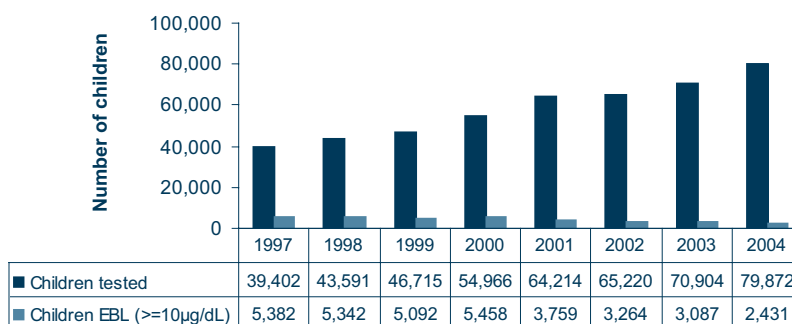
Lead poisoning can affect nearly every system in the body. Because lead poisoning often occurs with no obvious symptoms, it frequently goes unrecognized.

Lead can damage the brain and nervous system, cause hearing loss, anemia, slowed growth and behavior problems, depending on the amount of lead. Behavior problems and lowered IQ have been associated with blood lead levels as low as 10 micrograms per deciliter in children. Lead is used in many products. Missouri has been the top lead-producing state in the U.S. since 1907.

Fine particles of lead are hazardous when inhaled or swallowed. Children who are at higher risk for lead poisoning include those living in older housing units with lead-based paint; homes undergoing remodeling; families with lower socioeconomic status; and the former mining, milling and smelting areas of the state.²⁴

Environmental policy changes over the past few decades, including the removal of lead from gasoline, have markedly decreased children's exposure to lead. Nationally, the estimated proportion of children 1-5 years old with lead poisoning has been reduced from 88% in 1976-80 to 2.2% in 1999-2000.²⁵

Figure III-5. Missouri's children less than 6 years of age tested for lead poisoning and those with Elevated Blood Lead (EBL) level, 1997-2004



Source: DHSS, Childhood Lead Poisoning Prevention Program (CLPPP), Missouri Childhood Blood Lead Screening and Risk Data, available at <http://www.dhss.mo.gov/ChildhoodLead/Reports.html>

Missouri has seen a similar trend since 1997. Despite an increase in the number of young children being tested for lead poisoning, the number found with elevated blood lead levels has decreased from 5,382 children in 1997 to 2,431 in 2004 (Figure III-5).

Children living in areas with older housing are at higher risk for lead poisoning. Missouri has an average of 24% of housing units built before 1950, which is slightly higher than the national average of 22% according to 2000 census data. In the major Missouri metropolitan areas, the proportion of pre-1950 housing is highest in St. Louis City (65%), Kansas City (36%) and St. Louis County (18%). The average proportion in outstate Missouri is 19.6%, although in some rural counties the proportions are much higher.²⁶ St. Louis City has the highest number of children with EBL of 15 micrograms per deciliter or higher. In 2004, of the 826 Missouri children found to have lead levels this high, 468 (57%) were in St. Louis City, 83 (10%) in Jackson County, 49 (6%) in St. Louis County, and 226 (27%) were elsewhere in the state.²⁷

What can be done to decrease the number of children with elevated blood lead levels?

- Encourage lead hazard abatement in housing in the highest-risk areas;
- Make sure appropriate blood lead tests are done annually on all children under 6 living in high-risk areas;

- Provide follow-up services for children found to have elevated lead levels, including parental education, environmental investigation, lead hazard control and case management.

Overweight

Health habits and other behavior patterns developed during childhood have a strong impact throughout life. Overweight children are more likely to become overweight or obese adults, and therefore to be at higher risk for heart disease, type 2 diabetes, stroke, several types of cancer, and osteoarthritis.²⁸ Being overweight results from caloric imbalance (too few calories expended for the amount of calories consumed).

Unfortunately, the proportion of children who are overweight has increased drastically over the past three decades. In a national survey conducted in 1971-74, only 4% of children aged 6-11 years were overweight, but by 1999-2000 this had more than tripled to 15%. An estimated 61% of overweight young people have at least one additional risk factor for heart disease, such as high cholesterol or high blood pressure.²⁹ They are also at higher risk for bone and joint problems, sleep apnea, as well as social and psychological problems such as stigmatization and poor self-esteem.²⁴

There is no data to directly measure the proportion of Missouri children who are overweight. However, data on children participating in the Special Supplemental

Nutrition Program for Women, Infants and Children (WIC) provide a measure for children enrolled in WIC. These data show that the proportion of overweight WIC children 0-4 years of age increased from 9% in 1994 to 12% in 2003. This increase has been consistent across racial and ethnic groups. Hispanic children are especially likely to be overweight, and the proportion has increased from 12% in 1994 to 16% in 2003.³⁰

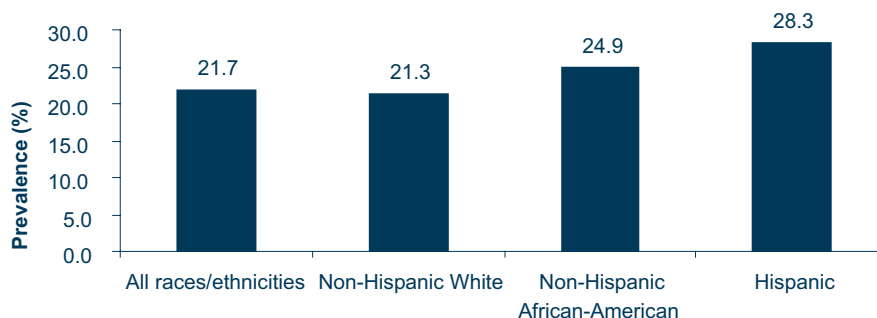
The Missouri School-Aged Children Health Service Program (MSCHSP) has collected information on program participants among the fifth-grade students. In the 2001-2002 school year, 22% of those participants were overweight; this percentage was 28.3% among Hispanics and 24.9% among non-Hispanic African-Americans (Figure III-6).

What can be done to decrease the number of overweight

children? Healthy lifestyle habits, including healthy eating and physical activity, can lower the risk of becoming overweight and developing related diseases.³¹ To support children's healthy habits, we can:

- Incorporate good nutrition and physical activity into childcare facilities and schools;
- Limit children's access to food choices of poor nutritional value in schools;
- Improve access to places for physical activity by building or enhancing trails, sidewalks, and recreational facilities;
- Encourage family and community involvement in promoting healthy lifestyles.

Figure III-6. Prevalence of overweight by race/ethnicity among MSCHSP participants in grade 5 aged 9-11 years, Missouri, 2001-02



Source: DHSS, Missouri School-aged Children Health Service Program (MSCHSP), available at http://www.dhss.mo.gov/EpiGrandRounds/Obesity_in_Missouri_-_The_Burden_on_Society_as_Missourians_get_Heavier.ppt

* Overweight is defined as at or above the 95th percentile of Body Mass Index (BMI) for age based on the 2000 CDC growth charts for the U.S.

Adolescents (Age 10-17 Years)

Adolescence is a time of transition from childhood to adulthood. It is one of the most dynamic and important stages of human development, a time of great physical, emotional, intellectual and social change. Unhealthy behaviors established during this time of life can become risk factors for chronic health conditions in adulthood. Healthier adolescents are more likely to succeed in school, and grow up to be healthier adults. Adolescence is an opportunity to involve and partner with youth to address the issues that affect their health.

In 2003 there were an estimated 658,000 adolescents between 10 and 17 years of age in Missouri, who made up 11.5% of the population.¹



Mortality and Leading Causes of Death

Missouri's adolescent death rate is higher than the U.S. rate. In 2002, 249 adolescents aged 10-17 died in Missouri, a rate of 37.8 per 100,000, compared with 32 per 100,000 in the U.S. as a whole. This is mainly because Missouri adolescents have a much higher rate of deaths from unintentional injuries, including motor vehicle crashes. Deaths from other causes were more comparable to the U.S. figures (Table IV-1).

In 2003, the Missouri death rate (per 100,000) from unintentional injuries in this age group was higher for

whites (22.5) than for African-Americans (13.6).

African-Americans have a much higher death rate (per 100,000) from homicide than whites (12.6 vs. 1.5); 13 of all the 21 homicide victims in 2003 were African-American.²

One measure of the impact of premature death is Years of Potential Life Lost (YPLL). YPLL is a count of the number of potential years lost to each person who has died before the age of 75. In 2003, there were 14,643 years of potential life lost by adolescents age 10-17 years who lived in Missouri.²

Table IV-1. Overall mortality rate and chief causes of death among children 10-17 years of age, Missouri and nationwide, 2002

Cause of Death	Number of MO Deaths	Rate of deaths per 100,000 population	Number of U.S. deaths	Rate of U.S. deaths per 100,000 population
All Causes	249	37.8	10,662	32.0
All Unintentional Injuries	143	21.7	4,943	14.8
Motor Vehicle Crashes	108	16.4	3,545	10.6
Homicide	21	3.2	949	2.8
Suicide	19	2.9	970	2.9
Malignant neoplasms (cancer)	11	1.7	916	2.7
Heart disease	8	1.2	361	1.1
Congenital anomalies (birth defects)	7	1.1	369	1.1

Source (Missouri): Missouri Department of Health and Senior Services (DHSS), Health Statistics

Source (U.S.): Centers for Disease Control and Prevention (CDC) WONDER, Leading Causes of Death (<http://webapp.cdc.gov/sasweb/ncipc/leadcaus10.html>), Bridged-Race Population Estimates (Vintage 2003) Request (<http://wonder.cdc.gov/Bridged-Race-v2003.HTML>)

Health Problems and Potential Opportunities for Prevention

Motor vehicle crashes and fatalities

Motor vehicle crashes (MVC) cause many injuries and deaths, as well as tremendous social and economic losses, including health care costs, lost school time, lost work time for parents, rehabilitation costs, and the long-term effects of permanent disability.³

Almost half of all deaths among adolescents in Missouri are caused by MVC. In 2003, 115 adolescents age 10-17 died as a result of MVC, a rate of 18 deaths per 100,000. The Missouri MVC death rate (per 100,000) in this age group is much higher than the national rate (16 vs. 11 in 2002) (Table IV-1).

White youths are more likely to be killed in MVC than African-Americans in Missouri (19 vs. 12 per 100,000 in 2003). Also, in 2003, 16,478 Missouri adolescents age 10-17 had an emergency room visit or were hospitalized as a result of motor vehicle crashes. This is a

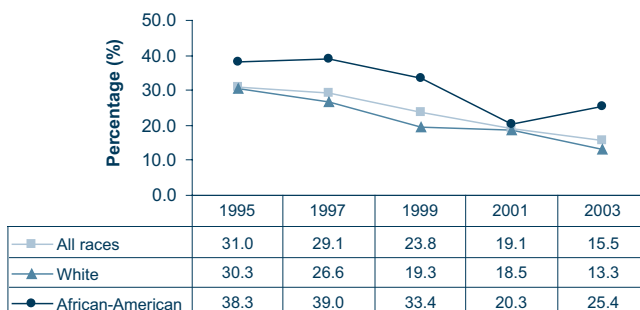
rate of 2.5% among adolescents. The rate was slightly higher among whites than African-Americans (2.5% vs. 2.2%).⁴

Results from the Youth Behavioral Risk Surveillance System (YRBSS) indicate that an increasing number of students are wearing seat belts (Figure IV-1). However, many still do not. Nationally, 18% of students in grades 9-12 during 2003 report never or rarely wearing a seat belt when riding in a car driven by someone else, while in Missouri the percentage is 16%. African-American students in Missouri are less likely than U.S. students as a whole to wear seatbelts (25% of Missouri students vs. 21% of U.S. students never or rarely use seat belts when riding).

What can be done to decrease the number of adolescents injured and killed in motor vehicle accidents? Some approaches that may work are:³

- Media campaigns and public education to encourage safety belt use;
- Primary enforcement of safety belt laws for all occupants of motor vehicles;
- Education, law enforcement and treatment programs that reduce drinking and driving;
- Raising the driving age and instituting driver education requirements;
- Improving road and automobile designs to prevent accidents.

Figure IV-1. Percentage of students in grades 9-12 who never or rarely wear a seat belt when riding in a car driven by someone else, Missouri, 1995-2003



Source: Youth Risk Behavior Surveillance System (YRBSS), available at <http://apps.nccd.cdc.gov/yrbss/SelectLocyear.asp?cat=1&Quest=Q9>

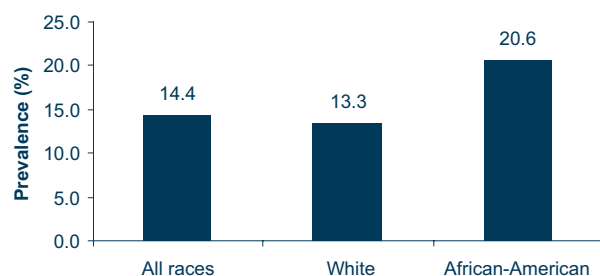
Overweight

The health risks of obesity are well documented. Eating and exercise habits formed during adolescence have a lifelong impact, and overweight adolescents have a 70% chance of becoming overweight or obese adults.⁵ People who are overweight and obese are more likely to develop chronic health problems, including heart disease, type 2 diabetes, arthritis, stroke, asthma, and some types of cancer. For adolescents, weight is a sensitive social and emotional issue as well.

Being overweight results from caloric imbalance (i.e., too few calories expended for the amount of calories consumed). Overweight in children and teenagers is determined based on age, height and weight.

The proportion of Missouri pre-teens and teens who are overweight has grown significantly in the past few years. The 1999 Missouri Youth Tobacco Survey (YTS) data

Figure IV-2. Prevalence of overweight* by race among middle school students in grades 6-8, Missouri, 2005



Source: DHSS, 2005 Missouri Youth Tobacco Survey (YTS)

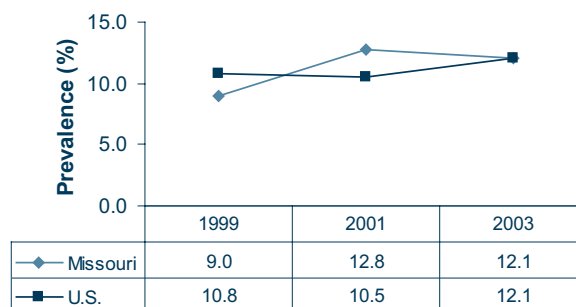
*Overweight is defined as at or above the 95th percentile of Body Mass Index (BMI) for age based on the 2000 CDC growth charts for the U.S.

showed that 9.1% of children in grades 6-8 were overweight, whereas the 2005 YTS data showed that this proportion has increased to 14.4%. The proportion was higher among African-Americans than whites (Figure IV-2).

According to the YRBSS data, the proportion of overweight teens in grades 9-12 in Missouri was 12.1% in 2003, the same as the national figure. The proportion had slightly increased from 1999 to 2003, both in Missouri and the U.S. (Figure IV-3).

What can be done to decrease the number of overweight adolescents? Healthy eating behaviors and regular physical activity are the key to reaching and maintaining a healthy weight. A healthier adolescent lifestyle includes:⁶

Figure IV-3. Prevalence of overweight among students in grades 9-12, Missouri and the U.S., 1999, 2001, and 2003



Source: YRBSS, available at <http://apps.nccd.cdc.gov/yrbss/SelectLocyear.asp?cat=5&Quest=507>

*Overweight is defined as at or above the 95th percentile of Body Mass Index (BMI) for age based on the 2000 CDC growth charts for the U.S.

- Eating 5-9 servings of fruit and vegetables every day;
- Increasing calcium and dairy product consumption;
- Decreasing portion sizes;
- Consuming fewer sweetened beverages;
- Watching less television;
- Daily moderate or vigorous physical activity, such as physical education classes.

Communities can promote and support these lifestyle changes in schools, workplaces, and through community programs that provide opportunities and encourage good nutrition and physical activity.

Tobacco use

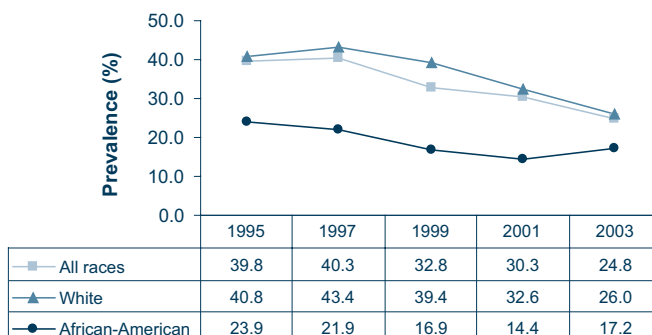
Tobacco use has serious health and economic consequences. In Missouri, smoking is the leading cause of premature death, and caused 9,475 deaths in 2003.⁷ An estimated 148,000 Missouri youths living today will

eventually die of smoking-related diseases.⁸ In 1998, the cost of smoking-related health care in Missouri was \$1.7 billion, and Medicaid care for smoking-related illnesses cost \$415 million.⁹

Early adolescence (age 11-15, grade 6-10) is the time when most smokers first try cigarettes. The majority of adult smokers become regular smokers before the age of 18. Youth whose parents or guardians smoke, and those whose parents have less than a high school education, are most vulnerable to starting to use tobacco themselves.¹⁰

The 2005 Missouri YTS found that 8% of children in grades 6-8 had smoked cigarettes within the past 30 days. By high school, the figures are much higher. In 2005, almost one quarter (24%) of Missouri youth in grades 9-12 reported smoking cigarettes within the past 30 days. According to data from the YRBSS, prevalence of current cigarette smoking among Missouri students in grades 9-12 has been trending slowly downward since 1997 (Figure IV-4).

Figure IV-4. Prevalence of current cigarette smokers* among high school students in grades 9-12, Missouri, 1995-2003



Source: YRBSS, available at <http://apps.nccd.cdc.gov/yrbss/SelectLocyear.asp?cat=2&Quest=Q30>

* All respondents who reported having smoked cigarettes on one or more of the 30 days prior to the survey.

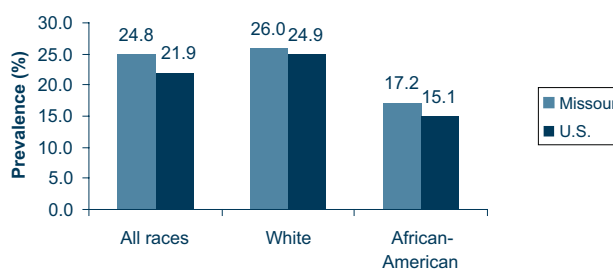
Smoking prevalence among Missouri high school students (25%) is higher than the national prevalence of 22% (Figure IV-5). It is more prevalent among white than African-American youths, but both groups exceed the national prevalences.

Tobacco use prevalence increases steadily from grade 6 through high school. The 2005 YTS found that 31% of Missouri high school seniors smoked cigarettes within the past 30 days, and the figure was 39% for use of any form of tobacco (Figure IV-6).

What can be done to reduce smoking among adolescents? Studies have shown that effective interventions include strategies to:¹⁰

- Increase the price of tobacco products so they are less affordable for youth;
- Improve youths' knowledge, beliefs and skills to help them resist societal pressures to smoke;
- Create tobacco-free school and community environments, so that smoking does not appear to be the norm;
- Decrease youth access to tobacco by enforcing laws against retail sales to minors;
- Promote quitting. Most youth who smoke report that they know it is unhealthy and have tried to quit. Due to the addictive nature of nicotine, counseling and cessation therapy are often needed to succeed.

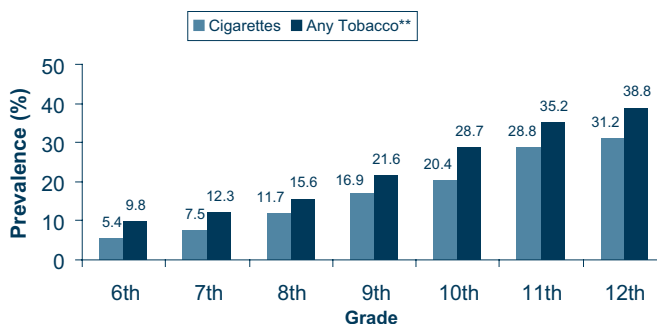
Figure IV-5. Prevalence of current cigarette smokers* among high school students in grades 9-12, Missouri and the U.S., 2003



Source: YRBSS, available at <http://apps.nccd.cdc.gov/yrbss/SelectLocyear.asp?cat=2&Quest=Q30>

* All respondents who reported having smoked cigarettes on one or more of the 30 days prior to the survey.

Figure IV-6. Prevalence of current tobacco use* by grade among Missouri students, 2005



Source: DHSS, 2005 Missouri YTS

* Respondents who reported having smoked cigarettes, or any form of tobacco on one or more of 30 days prior to the survey.

** includes cigarettes, cigars, bidis, kreteks, pipes, and smokeless tobacco.

Alcohol/substance abuse and mental health problems

The adolescent life stage can be a time of turmoil, with rapidly changing social roles, relationships and expectations. Many adolescents develop behavioral and emotional problems. Mental illness and alcohol and substance abuse are among the leading causes of hospitalization for this age group.

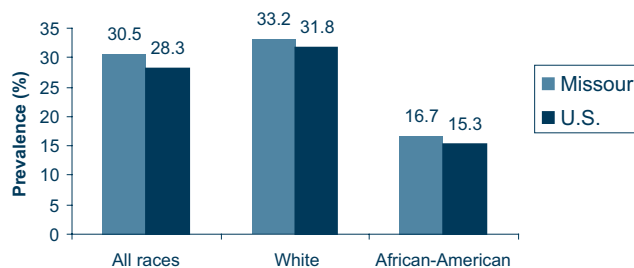
Underage drinking is common. In 2003, almost a third (31%) of Missouri teens in grades 9-12 reported that they drank heavily (defined as having five or more drinks in a row, within a couple of hours) during the last month (Figure IV-8), which is similar to the national figure of 28%. The Missouri figure has come down from 40% in 1995. White youths are almost twice as likely to drink heavily as African-American youth (33% vs. 17% in 2003) (Figure IV-7).

Marijuana use was reported by 22% of teens in the 2003 YRBSS. This is about the same figure reported nationally. African-American youths are substantially more likely to use marijuana than white youths in Missouri (Figure IV-8).

Teen inhalant use (including sniffing glue, breathing the contents of aerosol spray cans, or inhaling paints or sprays to get high) in Missouri appears to be similar to the U.S. as a whole. In 2003, 11% of Missouri teens reported ever having used an inhalant, compared with 12% nationally. Only 7% of African-American youth reported inhalant use, which is the same as the national percentage.¹¹

The number of hospitalizations for mental disorders among Missouri adolescents have risen over the past decade, from 6,786 in 1994 to 8,285 in 2003. The

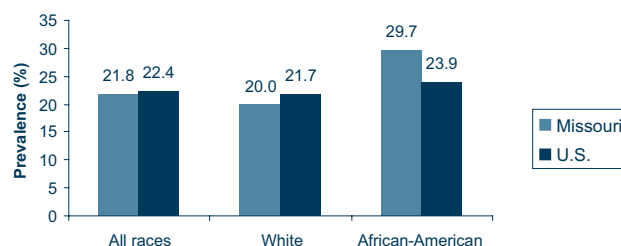
Figure IV-7. Prevalence of episodic heavy alcohol drinking* among students in grades 9-12, Missouri and the U.S., 2003



Source: YRBSS, available at <http://apps.nccd.cdc.gov/yrbss/SelectLocyear.asp?cat=3&Quest=Q42>

* All respondents who reported having had 5 or more drinks of alcohol in a row, that is, within a couple of hours, on one or more of the 30 days prior to the survey.

Figure IV-8. Prevalence of current Marijuana use among students in grades 9-12, Missouri and the U.S., 2003



Source: YRBSS, available at <http://apps.nccd.cdc.gov/yrbss/SelectLocyear.asp?cat=3&Quest=Q46>

* All respondents who used marijuana one or more times during 30 days prior the survey.

corresponding rate increased from 109 to 126 per 10,000 adolescents aged 10-17 years over the past decade (Figure IV-9). These disorders include a wide variety of problems, including affective and anxiety disorders, schizophrenia, and others. The rate among African-American youth has been consistently lower than that of whites.

The rate of emergency room visits for mental disorders has doubled in this age group since 1994. The rate for African-Americans was higher than for whites until 2002, and approximately equal since then (Figure IV-10).

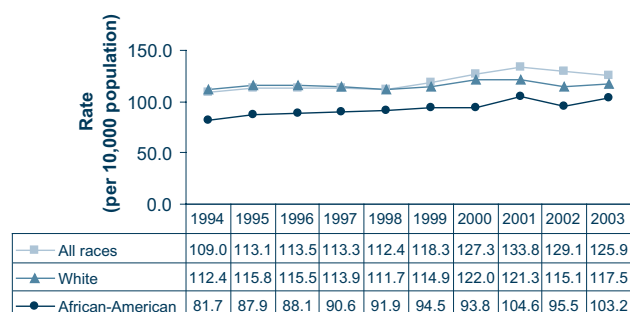
What can be done to reduce the number of youth with substance abuse or mental health problems? Studies show that the following approaches may work:

- Programs that encourage early recognition and treatment of mental health problems, especially in schools;¹²
- Systems of care to meet the mental health needs of children, adolescents, and their families within their home, school, and community environments;¹³
- Efforts to change social norms that support underage drinking;
- Reducing the availability of alcohol to minors;
- Improving the effectiveness of law enforcement.¹⁴

Asthma

Asthma is the most common chronic disease of childhood, and is a leading cause of disability among

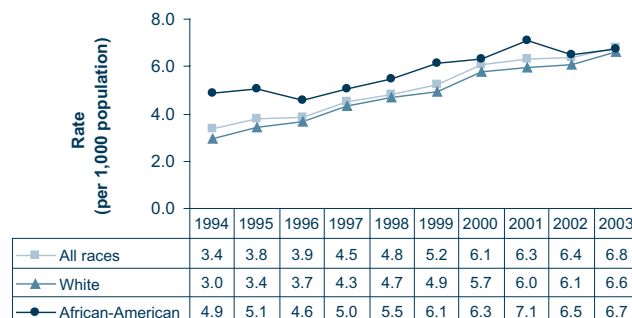
Figure IV-9. Hospitalization rate for mental disorders* by race among adolescents 10-17 years of age, Missouri residents, 1994-2003



Source: DHSS, Hospital Discharge MICA (Missouri Information for Community Assessment), available at http://www.dhss.mo.gov/D_C_DofCMICA/

* Principal diagnosis

Figure IV-10. Rate of emergency room visits for mental disorders* by race among adolescents 10-17 years of age, Missouri residents, 1994-2003



Source: DHSS, Emergency Room MICA, available at <http://www.dhss.mo.gov/EmergencyRoomMICA/index.html>

* Principal diagnosis

children under 18. Students with asthma frequently miss school.¹⁵ In a statewide health survey conducted by DHSS in 2004, 16% of Missouri adults with children under age 18 reported having one or more asthmatic children.¹⁶

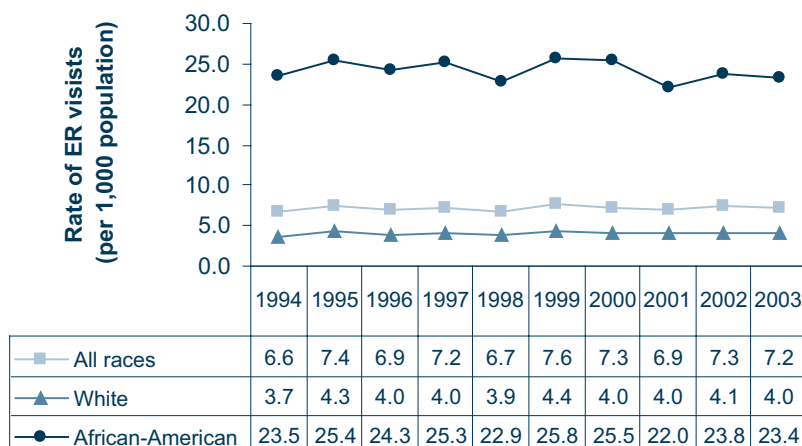
Asthma can be difficult to control, especially if families do not have access to continuous, comprehensive, coordinated care. Lung spasms and the loss of breath and, if not controlled, can be fatal. Many adolescents are taken to emergency rooms for treatment of asthma, although the rate is lower than in children under 10. In Missouri in 2003, there were 4,076 emergency room visits for asthma among youths 10-17 years old. This is a rate of 7.2 visits per 1,000 youths. The rate of ER visits

has remained relatively steady for the last 10 years. However, the rate of ER visits for African-American children is much higher than for white children (23.4 vs. 4.0 visits per 1,000 youths) (Figure IV-11).

What can be done to decrease the impact of asthma on Missouri's youth and reduce emergency care for asthma attacks? Currently, there are no preventive measures or cure for asthma, so the focus must be on controlling it. Studies have suggested that:

- Proper diagnosis and medication help to control asthma;
- Avoiding contact with environmental "triggers" is also important. Environmental triggers include cockroaches, dust mites, furry pets, mold, tobacco

Figure IV-11. Rate of asthma* emergency room (ER) visits among adolescents 10-17 years of age, Missouri, 1994-2003



Source: DHSS, Emergency Room MICA, available at <http://www.dhss.mo.gov/EmergencyRoomMICA/index.html>

* Principal diagnosis

smoke, and certain chemicals.¹⁷ This strategy calls

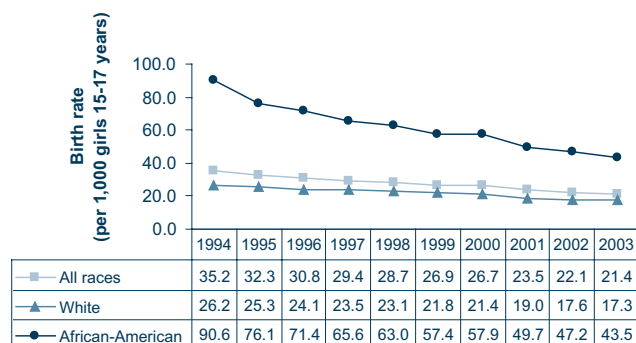
for educating parents who smoke;

- Coordinated school health programs that include asthma management programs can help youth manage their disease;
- Tobacco prevention and cessation programs targeted to youth can prevent tobacco use from making asthma worse.¹⁸

Teen births

Teen childbearing has serious consequences for teen parents, their children, and society. When teens give birth, their future prospects decline. Teenage mothers are less likely to complete high school, more likely to be single parents, and more likely to live in poverty than other teens.¹⁹ These factors put them at risk for poorer health as adults. Babies conceived by teen mothers are

Figure IV-12. Birth rate for teenagers 15-17 years, Missouri, 1994-2003



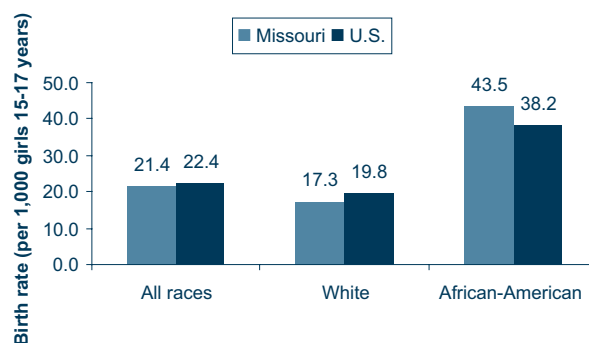
Source: DHSS, Birth MICA, Population MICA, available at <http://www.dhss.mo.gov/MICA/>

more likely to have low birth weight, prematurity, and growth restriction in the uterus.²⁰

There were 2,572 babies born to mothers aged 15-17 years in Missouri in 2003. That is a rate of 21 births for every 1,000 teen girls aged 15-17 years. The birth rate among teen girls aged 15-17 years has declined by 39% over the past decade from 1994 to 2003 (Figure IV-12). This mirrors the national trend.

In 2003, the teen birth rate in Missouri (21 per 1,000 teen girls aged 15-17 years) was very similar to that in the U.S. (22 per 1,000). White teens aged 15-17 years in Missouri actually have a lower rate than the U.S., but

Figure IV-13. Birth rate for teenagers 15-17 years, Missouri and the U.S., 2003



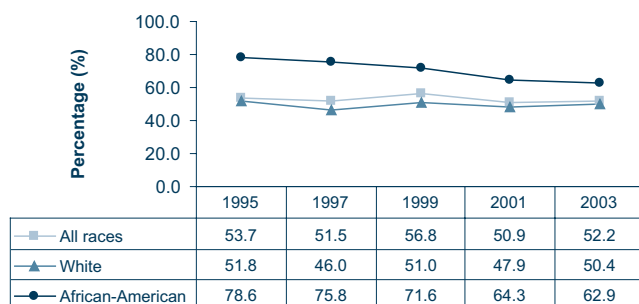
Source (Missouri): DHSS, Birth MICA, Population MICA, available at <http://www.dhss.mo.gov/MICA/>
 Source (U.S.): CDC, NCHS, Births: Final Data for 2003, available at http://www.cdc.gov/nchs/data/nvsr/nvsr54/nvsr54_02.pdf

African-American teens have a considerably higher rate (Figure IV-13).

Youth at greatest risk of pregnancy are those who live in areas with high poverty, low levels of education, high residential turnover, and high divorce rates. Other risk factors include school failure, drug and alcohol use, early sexual activity, and having an older teen or adult man as the first sex partner.¹⁹

The overall percentage of Missouri students in grades 9-12 who report ever having had sexual intercourse has not decreased. However, the percentage among African-American students, while much higher than among white students, has decreased significantly since 1995 (Figure IV-14). In 2003, the overall Missouri percentage (52%) is higher than the U.S. figure (47%), but the percentage among African-American students (63%) is lower than the U.S. figure (67%).

Figure IV-14. Percentage of students in grades 9-12 who ever had sexual intercourse, Missouri, 1995-2003



Source: YRBSS, available at <http://apps.nccd.cdc.gov/yrbss/SelectLocyear.asp?cat=4&Quest=Q58>

What can be done to prevent births to teen mothers? Research strongly suggests that youth development programs that include service learning and promotion of healthy behavior, life skills development, and a sense of purpose can reduce teen pregnancy.²¹ Delaying the start of sexual intercourse and improving contraceptive practices have contributed to declines in pregnancy rates among teens.¹⁹ Other approaches include:

- Strengthen parent and adolescent communication, emotional bonds, monitoring and relationships;
- Discourage teens to date partners older than their own age;
- Educate teens about how alcohol and drug use can put them at risk for pregnancy and related consequences;
- Support school, community and faith-based programs to educate youth and parents and provide positive youth development opportunities;
- Promote developmentally appropriate physical and mental health services to meet the needs of adolescents.

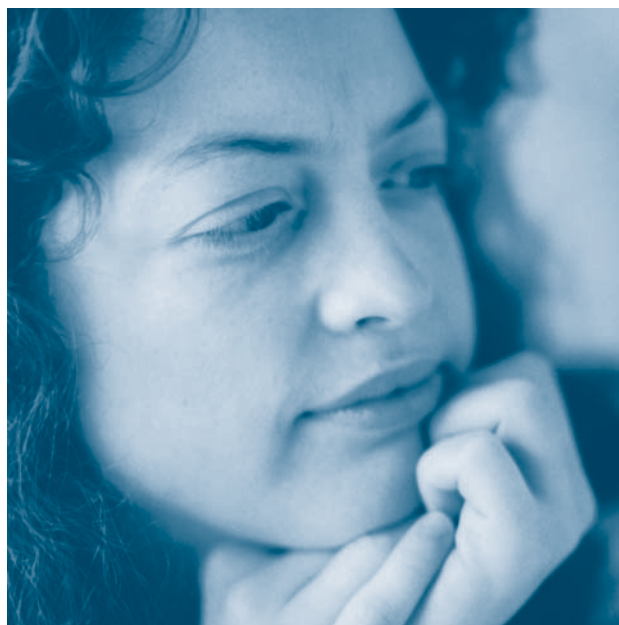
Adults (Age 18-64 Years)

During the adult years, the risk of disease and disability increases as people age. Adulthood is the time of peak responsibility and productivity, so illness and disability have a heavy economic and social impact during this life stage. However, much illness, disability, and premature death is avoidable through regular physical activity, healthy eating, avoiding tobacco use, responsible sexual behavior, safe driving behavior (including safety belt use and not driving while impaired), screening for chronic diseases and depression, and care management for chronic diseases.

In 2003, there were an estimated 3,537,000 adults between 18 and 64 years of age in Missouri, who made up 62% of the population.

According to the 2004 Current Population Survey, in 2003, 15% of Missouri adults had no health insurance. Most (78%) receive their health care coverage via private health insurance, provided through an employer or union, or purchased individually. Government plans (Medicaid, Medicare, or military health care) covered 11%, including 7% covered by Medicaid. All these figures reflect coverage for part or all of 2003. (Note: People can be covered by more than one type of health insurance during the year.)¹

A Missouri survey conducted in 2004 looked at the status of several population groups. A fifth (20%) of young adults aged 19-24 years lack health insurance at the time of the survey, the highest of all age groups; followed by those aged 25-34 years (14%), 35-54 years (11%), and 55-64 years (9%). People living above the federal poverty level, but below 200% of poverty, had the lowest rates of insurance coverage. People who did not complete high school were much more likely to be uninsured (15%) than college graduates (4%).²

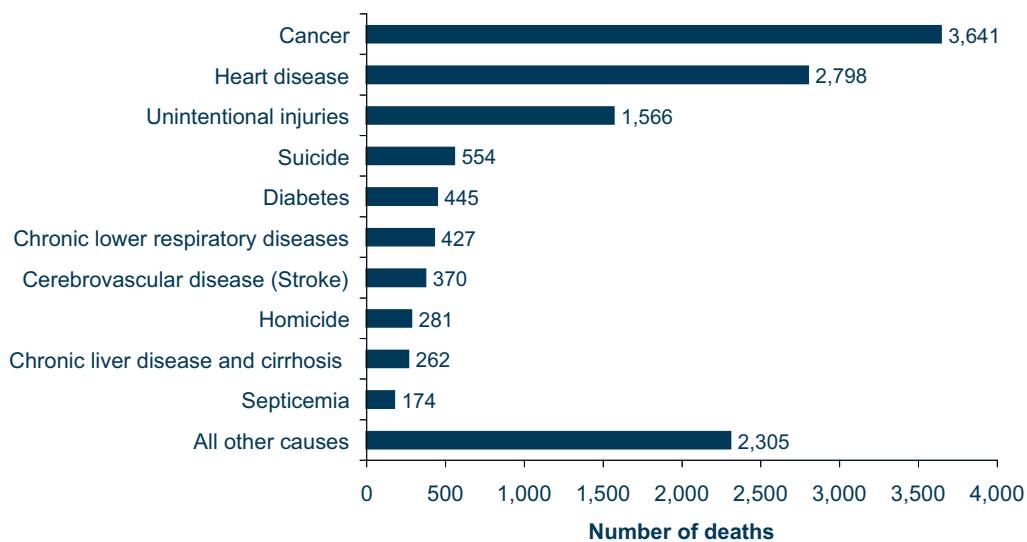


Mortality and Leading Causes of Death

Missouri's adult death rate is higher than the U.S. rate. In 2002, the death rate (per 100,000) for adults aged 18-64 years was 358 for Missouri, ³ compared with 326 for the U.S. ^{4,5} The leading causes of death in Missouri in 2003 are shown in Figure V-1.

For nine of the top 10 causes of death for Missouri adults, Missouri had higher death rates than the U.S. in 2002 (the most recent year U.S. data were available). ³⁻⁵ The greatest discrepancies were in death rates (per 100,000) due to heart diseases (79 for Missouri vs. 67 for the U.S.), cancers (103 for Missouri vs. 92 for the U.S.), and unintentional injuries, including motor vehicle crashes (43 for Missouri vs. 36 for the U.S.).

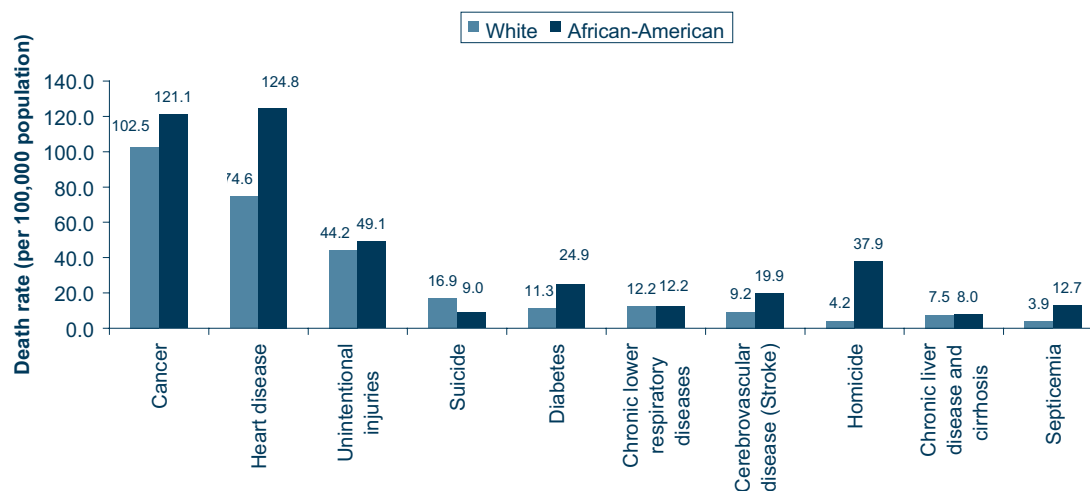
Figure V-1. Leading causes of death among adults 18-64 years of age, Missouri residents, 2003



Source: Missouri Department of Health and Senior Services (DHSS), Health Statistics

In 2003, African-American adults in Missouri had a higher overall death rate than whites (539 vs. 346 per 100,000), as were the rates for eight of the top ten causes of death for Missouri adults. Compared with whites, African-American adults had nine times the death rate due to homicide, more than twice the rate due to diabetes and stroke, and almost twice the rate due to heart disease. African-Americans also had higher death rates for cancer and unintentional injuries (Figure V-2).

Figure V-2. Death rate for leading causes of deaths among adults 18-64 years of age, Missouri residents, 2003

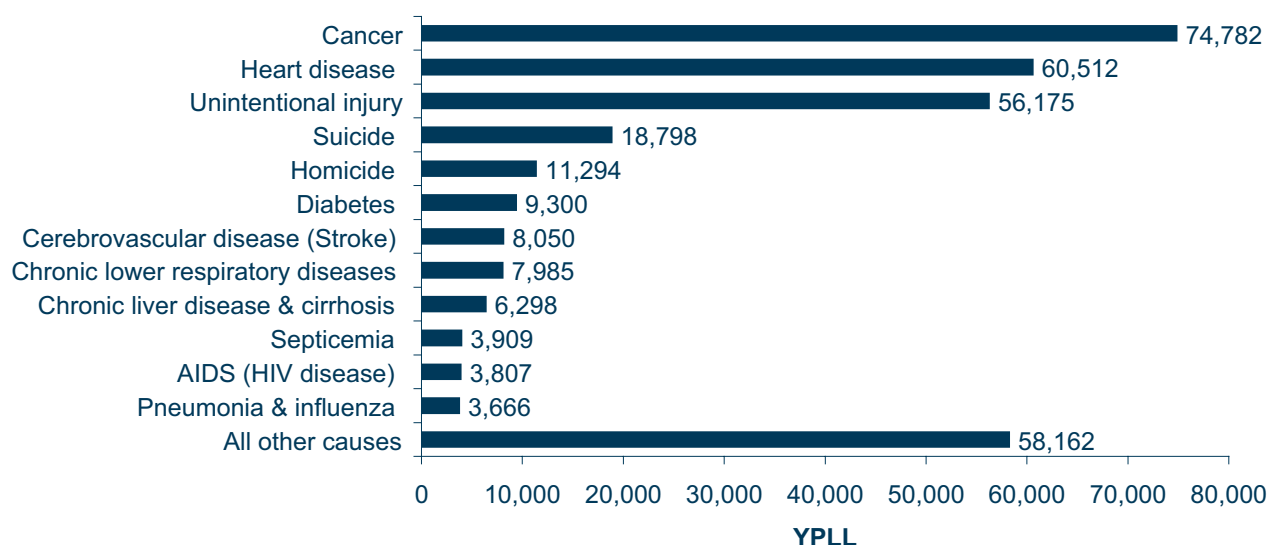


Source: DHSS, Health Statistics

One measure of the impact of premature death is Years of Potential Life Lost (YPLL). YPLL is a count of the number of potential years lost to each person who has died before the age of 75, which is then expressed as a rate. In 2003, there were 8,898 years of potential life lost for every 100,000 adults age 18-64 years living in Missouri.³ Cancer caused the most years of potential life lost in this age group, followed by heart disease and unintentional injuries (Figure V-3).



Figure V-3. Leading causes of years of potential life lost (YPLL) for Missouri residents 18-64 years of age, 2003



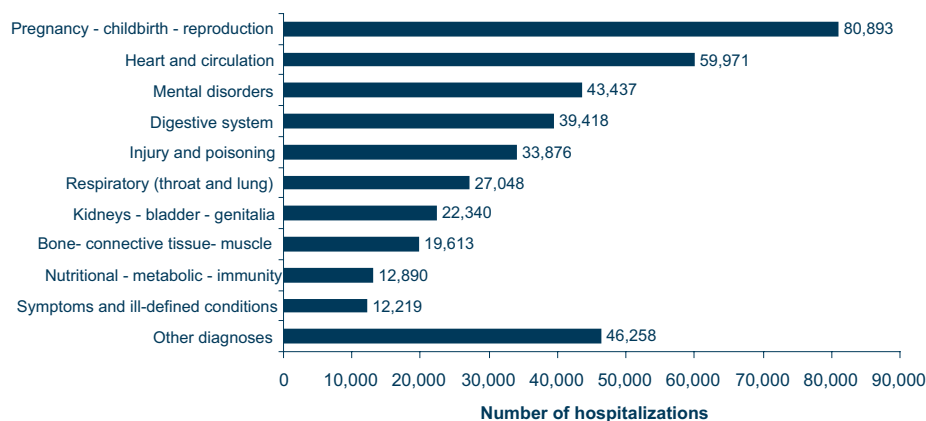
Source: DHSS, Health Statistics

Hospitalization and Disability

Apart from pregnancy and childbirth (which is not a disease or disorder per se), the two most common causes of hospitalization for this age group were heart and circulatory disease and mental disorders (Figure V-4).

According to the 2000 U.S. Census data, 18.2% of Missourians age 21-64 had a disability. The proportion of adults with a disability varied greatly by county, from 12% in St. Charles County to 30% in Mississippi County (Figure V-5). Disability among adults is defined as having at least one of the following: (a) blindness, deafness, or a severe vision or hearing impairment; (b) a substantial limitation in the ability to perform basic physical activities, such as walking, climbing stairs, reaching, lifting, or carrying; (c) difficulty learning, remembering, or concentrating; (d) difficulty dressing, bathing, or getting around inside the home; (e) difficulty going outside the home alone to shop or visit a doctor's office; and (f) difficulty working at a job or business.

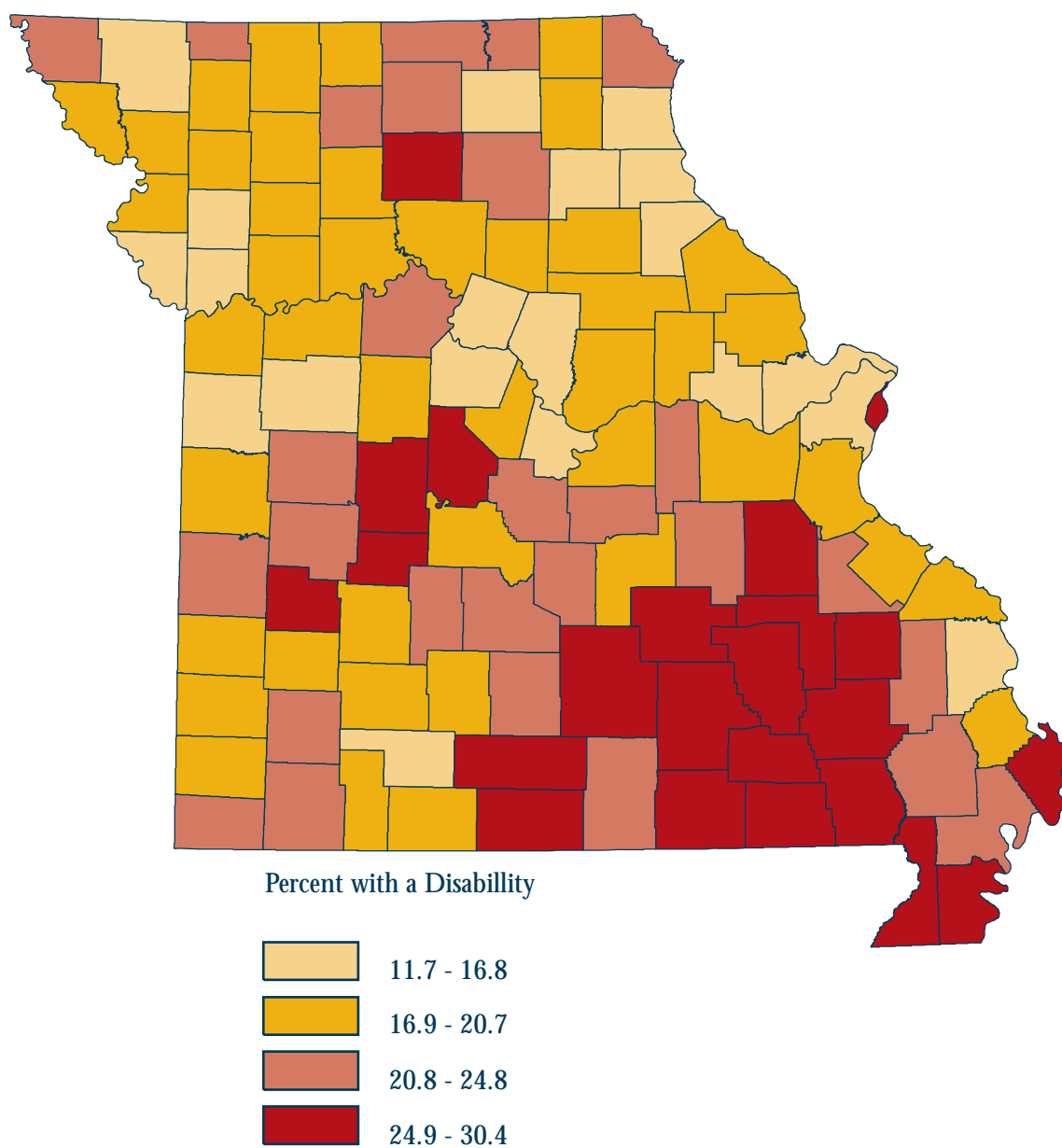
Figure V-4. Leading causes* of hospitalization among Missouri residents 18-64 years of age, 2003



Source: DHSS, MICA Hospital Discharge, available at http://www.dhss.mo.gov/D_C_DofCMICA/

* Principal diagnosis

Figure V-5. Adults aged 21-64 years with a disability, by county, Missouri, 2000



Source: U.S. Census Bureau, Census 2000 Summary Files 1 and 3, available at <http://mcdc2.missouri.edu/census2000/tablesetc.shtml>

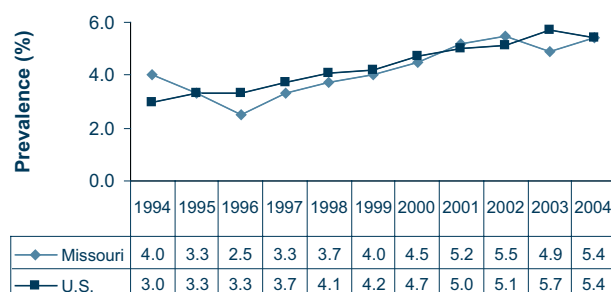
Health Problems and Potential Opportunities for Prevention

Chronic diseases influenced by health behaviors

Many of the leading causes of death, hospitalization and disability are strongly influenced by lifestyle and health behaviors. Tobacco use, overweight and obesity, and lack of physical activity contribute to heart disease, diabetes, chronic lower respiratory disease, stroke, and many types of cancer (including cancers of the lung, mouth, throat, esophagus, stomach, pancreas, colon, rectum, anus, cervix uteri, kidney, bladder, and leukemia).⁶ These diseases caused 49% of all deaths of Missouri adults 18-64 years of age in 2003.³ In 2003, 59,971 hospitalizations in Missouri in this age group were due to heart and circulatory diseases alone (Figure V-4).

The prevalence of doctor-diagnosed diabetes is around 5% for Missourians aged 18-64 years, the same as the national figure. Diabetes has increased over the past decade (Figure V-6). The prevalence is higher among African-Americans than whites, both in Missouri and the U.S.

Figure V-6. Prevalence of doctor-diagnosed diabetes among adults 18-64 years of age, Missouri and the U.S., 1994-2004



Source: Behavioral Risk Factor Surveillance System (BRFSS)

Lung cancer causes more deaths than any other type of cancer among both men and women. In 2003, 673 men aged 18-64 years and 472 women in that age group died of lung cancer in Missouri.⁷

Unfortunately, many Missourians do not practice healthy behaviors that can help prevent many chronic diseases and the resulting lost productivity, disability and deaths. Information about many health habits is collected through the Behavior Risk Factor Surveillance System (BRFSS), a telephone survey conducted by the University of Missouri-Columbia and DHSS.



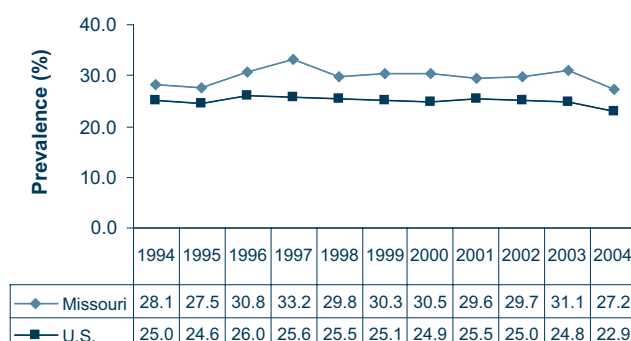
Tobacco use—Over one quarter of Missouri adults smoke. The Missouri prevalence of current smoking (27%) is higher than the U.S. prevalence of 23% (Figure V-7), mostly due to the higher rate among Missouri whites (27% in Missouri vs. 24% in the U.S.). The prevalence for African-Americans is closer to the national prevalence (23% in Missouri vs. 22% in the U.S.). The smoking prevalence among whites and African-Americans in Missouri has remained relatively unchanged in the last decade.

Impact of tobacco use—Tobacco use damages nearly every organ in the human body, causing many diseases and harming the general health. It damages the immune system and increases the risk of infections. Smokers are much more likely to suffer from coronary heart disease, the leading cause of death in Missouri and the U.S. Tobacco use also causes many types of cancer.⁶ It is

estimated to be responsible for one of every five deaths in Missouri. Smokers who quit before the age of 50 can cut the risk of dying in the next 15 years by a half.⁸

Obesity and Overweight—The prevalence of obesity among Missouri adults has more than doubled since 1990, consistent with the national trend. Over one quarter (26%) of Missourians 18-64 years of age are now obese, compared with 24% nationally (Figure V-8).

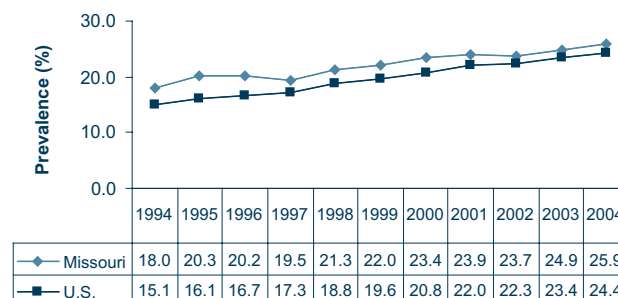
Figure V-7. Prevalence of current smoking* among adults 18-64 years of age, Missouri and the U.S., 1994-2004



Source: BRFSS

* Respondents who have ever smoked 100 cigarettes in their lifetime and reported smoking every day or some days

Figure V-8. Prevalence of obesity* among adults 18-64 years of age, Missouri and the U.S., 1994-2004



Source: BRFSS

* Body Mass Index (BMI) 30.0 or more

Obesity is defined according to body mass index (BMI), which is a person's weight (in kilograms) divided by his or her height (in meters) squared. For example, a person who weighs 203 pounds (92 kilograms) and is 5'9" tall (1.75 meters) has a BMI of 30.0. A person with a BMI of 30.0 or more is considered to be obese.

African-Americans are more likely to be obese, both in Missouri and nationally. In 2004, obesity prevalence is higher in Missouri than in the U.S. for both whites (25% in Missouri vs. 23% in the U.S.) and African-Americans (37% in Missouri vs. 33% in the U.S.) (Figure V-9).

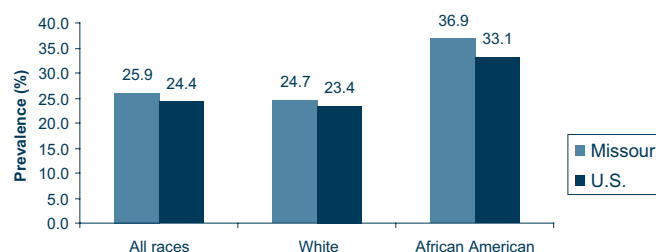
People with a BMI of 25-29.9 are defined as overweight. Over one third (37% in 2004) of Missouri adults 18-64 years of age are overweight, which puts them at increased risk of becoming obese. The proportion of overweight in Missouri adults has remained relatively stable since 1994.

Impact of obesity and overweight—Obesity can lead to serious health problems, including heart disease and stroke, two of the leading causes of death. Being overweight or obese also increases the risk of hypertension, high cholesterol, diabetes, arthritis, several types of cancer, asthma, reproductive problems, and other diseases and conditions.

Low physical activity—Over half of Missourians do not get the recommended amount of moderate or vigorous physical activity. Recommended moderate physical activity is defined as at least 30 minutes of moderate physical activity per day, 5 or more days per week; recommended vigorous physical activity is defined as at least 20 minutes of vigorous physical activity per day, 3 or more days per week. In 2003, the most recent year



Figure V-9. Prevalence of obesity* by race among adults 18-64 years of age, Missouri and the U.S., 2004



Source: BRFSS

* Body Mass Index (BMI) 30.0 or more

this information was collected, 53% of Missouri adults 18-64 years of age did not exercise enough, which was about the same as in the U.S. as a whole. The Missouri percentage in 2001 was 58%, so there appears to have been some improvement during the past few years. More African-Americans than whites reported not getting enough physical activity (58% vs. 52% in 2003).

Impact of low physical activity—Obesity and overweight result from caloric imbalance (too few calories expended for the amount of calories consumed). Physical activity is very important in maintaining a healthy weight and preventing the many health risks of obesity and overweight.

Low consumption of fruits and vegetables—A large majority of adults 18-64 years of age consume less than the recommended five servings per day of fruits and vegetables. In Missouri in 2004, the percentage was 78%, the same as the 2003 figure in the U.S. (the 2004 U.S. data are not available). This proportion has decreased somewhat over the last decade, from 82% in Missouri in 1994. The difference between African-Americans and whites is small.

Impact of low consumption of fruits and vegetables—Eating fruits and vegetables, which are rich in nutrients and low in calories, helps adults maintain a healthy weight. People who eat few fruits and vegetables are likely to consume more calories in their daily diet.

What can be done to increase the number of adults who practice healthy behaviors? Some effective strategies are:

- Foster changes in the workplace to improve physical activity and nutritional habits, including

environmental and policy changes and education programs;

- Provide assistance and support for communities to improve physical activity and nutritional habits, including environmental and policy changes, community coalitions and family-focused community activities;
- Improve health care providers' knowledge, skills and resources to enhance prevention, treatment, and management of weight;⁹
- Motivate people to quit smoking through effective media messages;
- Increase access to affordable smoking cessation services, which are more cost effective than many other common clinical services;
- Increase the price of tobacco products, which decreases consumption;
- Train and encourage health care providers to counsel patients to quit smoking;
- Decrease exposure to secondhand smoke through public awareness and policy changes;⁸
- Encourage the use of appropriate screening tests for chronic diseases, and assure access to screening;
- Promote the use of care management for people with chronic diseases.

Mental health problems

Mental health problems create a significant burden, both for those directly affected and for the society as a

whole. Mental illness and abuse of alcohol and substance affect individuals' quality of life, family and community relationships, and productivity, as well as the health care system. The causes of these problems may include physical changes in the brain, genetic factors, and social and behavioral factors. People with mental health problems often face stigma and discrimination.¹⁰

There are many different types of mental health problems, including affective disorders such as depression and bipolar disorder, anxiety and personality disorders, alcohol and substance abuse, schizophrenia, senility and organic mental disorders, and mental retardation.

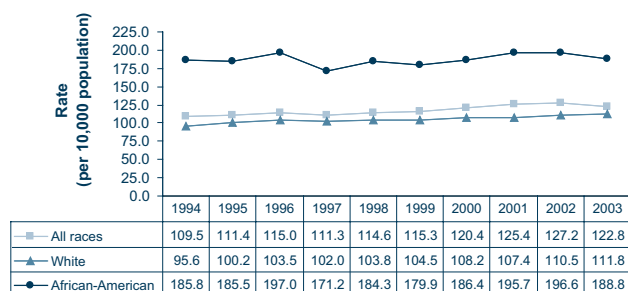
Suicide was the fourth leading cause of death among Missourians 18-64 years of age in 2003, with 554 deaths (Figure V-1). Research has shown that more than 90 percent of people who kill themselves have depression or

another diagnosable mental or substance abuse disorder, often in combination with other mental disorders.¹¹

In 2003, mental disorders were the third leading cause of hospitalization in Missouri adults, with 43,437 hospital admissions, accounting for 11% of all hospitalizations. The trend has been gradually upward over the last decade. The hospitalization rate for mental disorders among Missouri adults is consistently higher among African-Americans (Figure V-10).

Many people suffer from mental health problems without being hospitalized. In 2004, the Missouri BRFSS found that 11% of adults 18-64 years of age reported frequent mental distress, defined as 14 or more

Figure V-10. Hospitalization rate for mental disorders* among adults 18-64 years of age, by race, Missouri residents, 1994-2003



Source: DHSS, MICA Hospital Discharge, available at http://www.dhss.mo.gov/D_C_DofCMICA/

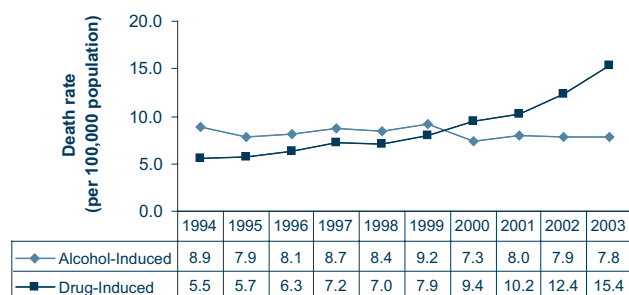
* Principal diagnosis



mentally unhealthy days in the past 30 days. This was consistent with the national rate.

Alcohol and substance abuse contribute to serious health problems as well as lost productivity and social problems within families and communities. Excessive drinking can cause many chronic illnesses, such as liver cirrhosis, pancreatitis, various cancers (including cancer of the liver, mouth, throat, larynx, and esophagus), high blood pressure, and psychological disorders. It can also cause acute problems, such as motor vehicle injuries, falls, domestic violence, rape, and child abuse.¹²

Figure V-11. Alcohol-induced and drug-induced deaths among adults 18-64 years of age, Missouri residents, 1994-2003*



Source: DHSS, Health Statistics

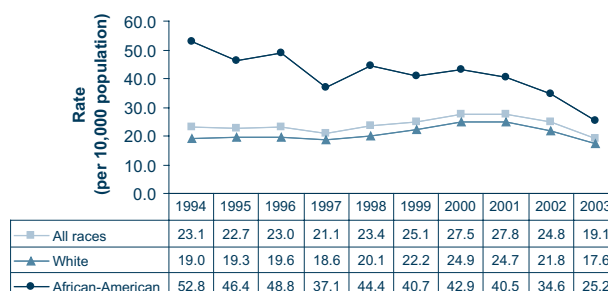
* ICD-9 (Ninth Revision of the International Classification of Diseases) codes were used for death data 1998 and earlier; ICD-10 codes have been used since 1999.

For all drugs, including alcohol, deaths were included if attributed to dependence, nondependent use, accidental poisoning, homicidal poisoning, or suicide. In addition, alcoholic polyneuropathy, cardiomyopathy, and gastritis are included, as are chronic liver disease and cirrhosis when specified as due to alcohol.

According to Missouri death records, there were 275 alcohol-induced and 543 drug-induced deaths among adults aged 18-64 years in 2003. While alcohol-induced deaths increased only slightly between 2000 and 2003, drug-induced deaths increased more than 50% (Figure V-11). Alcohol- and drug-induced death rate (per 100,000) is consistently higher among African-American adults than among whites in Missouri (35 vs. 22 in 2003).³

There were 6,770 hospitalizations for treating mental disorders due to alcohol and substance abuse for Missouri adults in 2003, accounting for 16% of all hospitalizations due to mental disorders. The hospitalization rate (per 10,000) for alcohol- and substance-related mental disorders among Missouri adults has ranged from 19 to 28 during 1994 to 2003 (Figure V-12). The decrease in hospitalizations in 2002 and 2003 may be partly due to funding cuts that have

Figure V-12. Hospitalization rate for treatment of alcohol- and substance-related mental disorders* among adults 18-64 years of age, by race, Missouri residents, 1994-2003



Source: DHSS, MICA Hospital Discharge, available at http://www.dhss.mo.gov/D_C_DofCMICA/

* Principal diagnosis

reduced the number of people receiving publicly funded alcohol and drug abuse treatment.

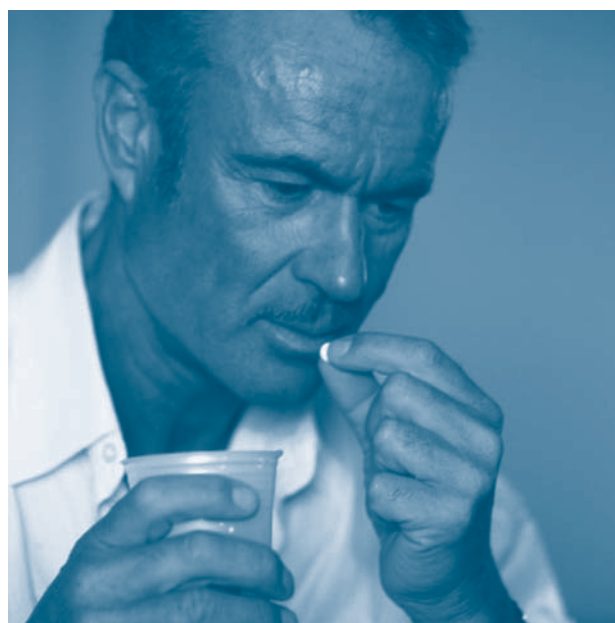
The hospitalization rate for treatment of mental disorders due to alcohol and substance abuse among African-American adults is substantially higher than that for whites in Missouri, but this disparity has narrowed over the past decade (Figure V-12).

Data from hospitals does not show the whole picture, however. Outpatient treatment for alcohol abuse (counseling, twelve-step programs, etc.) is common. In addition, The U.S. Substance Abuse and Mental Health Services Administration (SAMHSA) estimates that 6-9% of Missourians at age 12 and older needed treatment

for alcohol abuse in the past year but did not receive it. Likewise, 2-3% of Missourians needed but did not receive treatment for illicit drug use (2002-2003 data).¹³

What can be done to reduce the number of people with substance abuse or mental health problems? Some approaches that may work are:

- Promote healthy nutrition, physical activity, and weight control. All of these help reduce stress that may contribute to mental health problems;¹⁰
- Encourage primary care providers to use a simple screening protocol to identify depression in all adult patients at all primary care visits;
- Follow up with more definitive diagnostic interviews, when indicated, and appropriate patient management;



- Provide referrals to needed preventive services (community-based services, education, social services);
- Provide mental health diagnostic services and patient management to adults with chronic diseases.¹⁴

The good news is that most mental health problems can be treated successfully and the affected person can return to a full and productive life.¹⁰

Motor vehicle crashes

Motor vehicle crashes (MVC) cause many injuries and deaths, as well as tremendous social and economic losses, including health care costs, lost productivity, rehabilitation costs, and the long-term effects of permanent disability.¹⁵

The burden of MVC deaths is higher in Missouri than nationally. In 2002, 861 Missouri adults died in motor vehicle crashes, a rate of 25 per 100,000, compared with the U.S. rate of 18 per 100,000.³⁻⁵ The rate was slightly higher for whites than for African-Americans (24 vs. 21 per 100,000) in 2003.³ The death rate from MVC is significantly higher among young adults aged 18-19 years (49 per 100,000 in 2003) than any other age groups in Missouri.⁷

A large number of people are seen in hospital emergency rooms or hospitalized for injuries from motor vehicle crashes. In 2003, 60,912 Missouri adults 18-64 years of age (1,722 per 100,000 people) were treated in ERs or hospitalized with such injuries. The number of ERs and hospitalizations per 100,000 adults for African-Americans was substantially higher than that for whites

(2,740 vs. 1,556). The overall trend has been going up over the past decade.¹⁶

What can be done to decrease the number of adults injured and killed in motor vehicle accidents? Some approaches that may work are:

- Media campaigns and public education to encourage safety belt use;
- Enforcement of safety belt laws for all occupants of motor vehicles;
- Education, law enforcement and treatment programs that reduce drinking and driving;
- Designing better roads and automobiles to prevent accidents.¹⁵

Arthritis

Arthritis is the leading cause of disability in the U.S. Joint pain and stiffness are its characteristic symptoms. The two most common kinds of arthritis are osteoarthritis and rheumatoid arthritis.¹⁷

Osteoarthritis is the degeneration of cartilage and its underlying bone within a joint, as well as bony overgrowth. Osteoarthritis begins gradually, usually after age 40, and commonly affects the knees, hips, hands and spine. There is currently no cure.

Rheumatoid arthritis is a systemic inflammatory disease that can start at any age. The inflammation primarily affects the lining of the joints, but can also affect other organs. Genes may play a role in the cause. New drugs are available to treat this disease. However, currently there is no cure.

In the 2004 BRFSS survey, a quarter (25%) of Missourians 18-64 years of age reported that they had physician-diagnosed arthritis. This was similar to the U.S. estimate of 23%.¹⁸ The prevalence of arthritis increases with age, and it is more common in women than in men. There is no marked racial disparity for this disease.

What can be done to reduce the number of people with arthritis and the disability associated with it?

Unfortunately, nothing can be done about the currently known risk factors, such as age, sex and genetic predisposition. However, some approaches can help improve or maintain functioning and quality of life, including:

- Appropriate medication;
- Physical or occupational therapy;
- Maintaining a healthy weight, or losing weight, especially if the knees are affected;
- Patient self-management education and support;¹⁷
- Physical activity, which can have a beneficial effect on arthritis pain and associated disability;¹⁹
- Surgical intervention in some cases.

Breast and prostate cancers

Of all the new cancer (excluding skin cancer) cases diagnosed every year among Missouri women 18-64 years of age, breast cancer is the most common type of cancer. (Accurate data on skin cancer are unavailable because not all types of skin cancer are reportable to the Missouri Cancer Registry.) In 2002, there were 2,691 new cases of breast cancer in Missouri women in this

age group. Breast cancer risk increases with age: the incidence rate (per 100,000) was 20 for women aged 25-34 years, and 388 for women aged 55-64 years in 2002. The overall rate for adult women in Missouri has not changed since 1996.²⁰

Breast cancer claimed the lives of 360 Missouri women 18-64 years of age in 2003. The annual number of deaths has fluctuated during the last decade (304-432 per year). The risk of death is higher for African-American than for white women (31 vs. 19 per 100,000 in 2003).^{7, 21} Early detection and treatment of breast cancer greatly improve the chance of survival.

Of all the new cancer (excluding skin cancer) cases diagnosed, prostate cancer is the most common type of cancer for Missouri men 18-64 years of age, with 1,356 diagnosed cases in 2002. The risk of prostate cancer increases with age: the incidence rate (per 100,000) was 5 for men aged 35-44 years, and 380 for men aged 55-64 years.²⁰ Prostate cancer caused 42 deaths among Missouri men 18-64 years of age in 2003. The death rate (per 100,000) among African-Americans was 5, compared with 2 for whites.^{7, 21}

What can be done to decrease the burden of breast and prostate cancer?

- Educate health care providers and the public to promote appropriate screening methods;
- Assure availability of mammograms for all women at the recommended frequency, which depends on age and risk factors;
- Facilitate rapid referral for diagnostic testing for those with abnormal screening results.

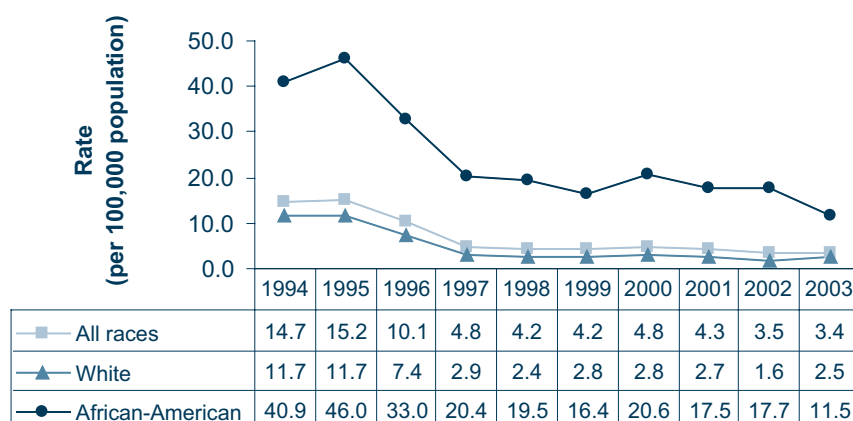
HIV/AIDS and sexually transmitted diseases (STDs)

The death rate due to HIV/AIDS has fallen dramatically over the past decade, as effective drug therapy has become widely available. In 2003, 121 Missouri adults 18-64 years of age died of HIV/AIDS, down from 470 in 1994. The age-adjusted Missouri death rate is considerably lower than the U.S. rate (2 vs. 5 per 100,000 in 2002).^{7, 22}

African-Americans are at much higher risk of dying from HIV/AIDS. In 2003, the death rate (per 100,000) for adults aged 18-64 years was 12 for African Americans, compared with 3 for whites in Missouri (Figure V-13).



Figure V-13. Death rate for HIV/AIDS among adults 18-64 years of age, Missouri residents, 1994-2003*



Source: DHSS, MICA Death, available at <http://www.dhss.mo.gov/DeathMICA/index.html>

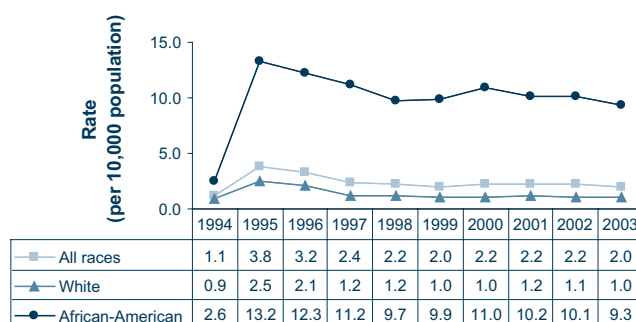
* ICD-9 (Ninth Revision of the International Classification of Diseases) codes were used for death data 1998 and earlier; ICD-10 codes have been used since 1999.

The hospitalization rate for HIV/AIDS among Missouri adults has been relatively stable since 1997. There were 702 hospitalizations in 2003. Again, the hospitalization rate per 10,000 people is much higher for African-Americans than for whites (9 vs. 1) (Figure V-14).

The number of newly diagnosed cases of HIV infection continues to decline, but the racial disparity has not narrowed much during the past decade (Figure V-15).

Sexually transmitted diseases (STDs) caused by bacteria do not commonly cause deaths or even require hospitalization, but they do cause serious complications, especially in women. Syphilis, if not diagnosed and treated, can progress to a debilitating chronic disease and cause serious health problems in infants infected through their mothers. The number of reported primary and secondary syphilis cases in Missouri adults 18- 64 years of age declined rapidly from 544 cases in 1995 to only 25 cases in 2001, but has been rising since then, with 91 cases in 2004.²³

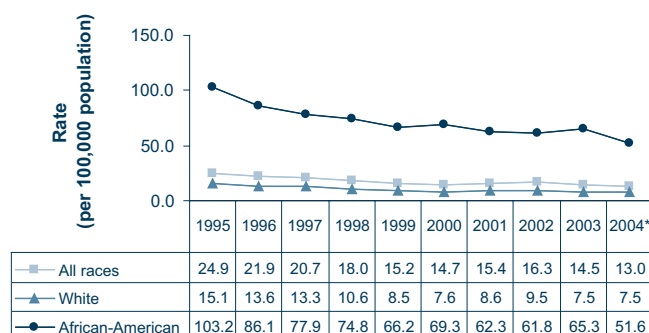
Figure V-14. Hospitalization rate for HIV infection* among adults 18-64 years of age, by race, Missouri residents, 1994-2003



Source: DHSS, MICA Hospital Discharge, available at http://www.dhss.mo.gov/D_C_DofCMICA/

* Principal diagnosis

Figure V-15. Rate of reported cases of newly diagnosed HIV/AIDS among adults 18-64 years of age, by race, Missouri, 1995-2004



Source

Case counts: DHSS, Communicable Disease Surveillance, HIV/AIDS Reporting System;

Population estimates: DHSS, Health Statistics

* Provisional data used for 2004; 2003 population estimate used to calculate 2004 rate

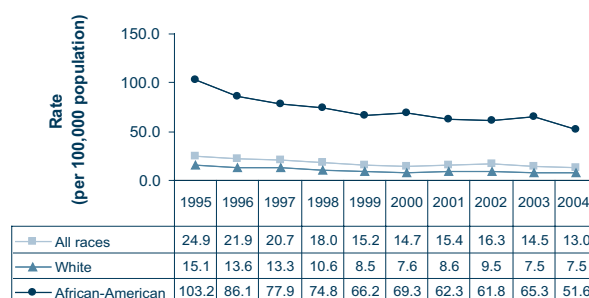
Chlamydia is the most common STD, and it has also been on the rise in recent years. In 2003, Missouri's reported rate of chlamydia infections ranked 15th among all states in the U.S. However, the large number of reported cases (17,264 among adults 18-64 years of age in 2004) represents only the "tip of the iceberg," because most chlamydia infections do not cause symptoms unless severe complications such as pelvic inflammatory disease develop. The rate for African-Americans (1,963 per 100,000) is more than ten times that for whites (167 per 100,000) in 2004 (Figure V-16).

Gonorrhea is the second most frequently reported STD, with 7,879 reported cases in Missouri in 2004, and also shows a marked racial disparity (Figure V-17). Missouri ranked 10th among all states in the U.S. for gonorrhea incidence in 2003.

What can be done to decrease the incidence of HIV/AIDS and STDs?

- Educate people to reduce risks through safer lifestyle practices;
- Target outreach and screening to those at highest risk;
- Assure adequate and timely treatment for infected people;
- Provide public health intervention (identification, testing and treatment of partners).

Figure V-16. Rate of reported cases of chlamydia among adults 18-64 years of age, by race, Missouri, 1995-2004

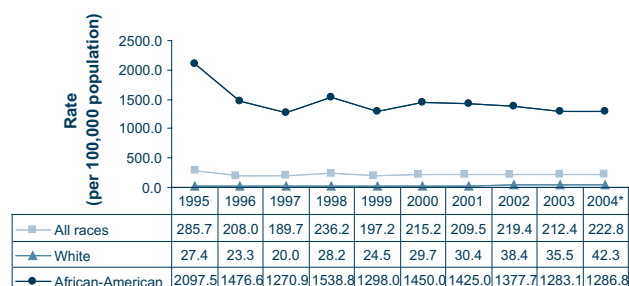


Source

Case counts: DHSS, Communicable Disease Surveillance
Population estimates: DHSS, Health Statistics

* Provisional data used for 2004; 2003 population estimate used to calculate 2004 rate

Figure V-17. Rate of reported cases of gonorrhea among adults 18-64 years of age, by race, Missouri, 1995-2004



Source

Case counts: DHSS, Communicable Disease Surveillance
Population estimates: DHSS, Health Statistics

* Provisional data used for 2004; 2003 population estimate used to calculate 2004 rate

Seniors (Age 65 years and older)

The risk of disease and disability clearly increases with advancing age, but poor health is not an inevitable consequence of aging. Much of the illness, disability, and death associated with chronic diseases are avoidable through known prevention measures. Many seniors can improve and sustain their quality of life by practicing a healthy lifestyle.

In 2003 there were an estimated 760,000 seniors 65 years of age and over in Missouri.¹ Missouri has a slightly higher proportion of people in this age group (13.3%)¹ than the U.S. as a whole (12.4%).² The senior population in Missouri has grown by only 2% over the past decade, from an estimated 745,000 in 1994.¹

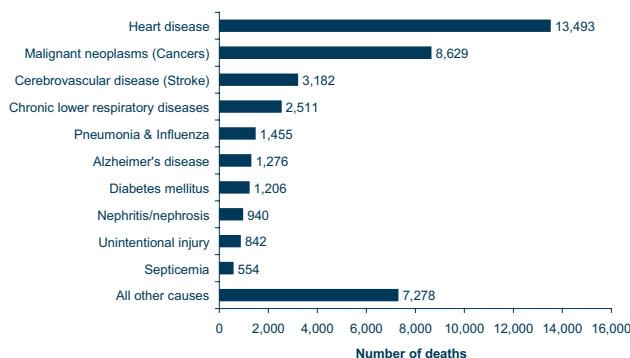
That will soon change, however. Nationally, the number of older Americans is expected to more than double by 2030. The Centers for Disease Control and Prevention (CDC) estimates that seniors will make up 15-20% of Missouri's population by 2015, and 20-30% by 2025. This means that at least one in five Missourians will be 65 years of age or older by 2025.³



Mortality and Leading Causes of Death

The death rate among Missouri seniors is higher than the U.S. rate. In 2002, 42,017 people 65 years of age and over died in Missouri, for a rate (per 100,000 seniors) of 5,541,⁴ compared with the U.S. rate of 5,088.^{2, 4, 5} Chronic diseases cause most deaths among Missouri seniors (Figure VI-1). For nine of the top 10 causes of death, Missouri seniors had higher death rates than the U.S. as a whole in 2002 (the most recent year U.S. data available).^{2, 4, 5} Missouri seniors' death rates (per 100,000) were at least 10% higher than the U.S. as a whole for: Heart disease (1,818 in Missouri vs. 1,619 in the U.S.); cerebrovascular disease (460 in Missouri vs. 402 in the U.S.); influenza and pneumonia (194 in Missouri vs. 165 in the U.S.); kidney disease (nephritis/nephrosis) (121 in Missouri vs. 96 in the U.S.); and unintentional injuries (109 in Missouri vs. 95 in the U.S.).

Figure VI-1. Leading causes of death among seniors 65 years of age and over, Missouri residents, 2003



Source: Missouri Department of Health and Senior Services (DHSS), Health Statistics

The one exception was Alzheimer's disease. The rate of this disease was slightly lower in Missouri (156 per 100,000) than in the U.S. (164 per 100,000) in 2002.

There are notable differences in death rate and leading causes of death between African-American and white seniors in Missouri. In 2003, the overall death rate for African-American seniors was 8% higher than for whites (5,865 vs. 5,441 per 100,000). African-American rates were higher for five of the top 10 causes of death for Missouri seniors. The death rate due to diabetes was about twice as high for African-American seniors (297 vs. 148 per 100,000) as for whites. African-American death rates were also higher for septicemia (overwhelming infection) (67% higher), kidney disease (nephritis/nephrosis) (49% higher), cancer (22% higher), and heart disease (10% higher).⁴

Hypertension and hypertensive kidney disease were among the top 10 causes of death for African-American seniors (113 deaths per 100,000), but not for whites.⁴

On the other hand, the death rate from chronic lower respiratory disease was more than twice as high for white seniors as for African-American seniors (345 vs. 172 per 100,000). The death rates for whites were also higher for Alzheimer's disease (92% higher), as well as pneumonia and influenza (34% higher).⁴

Unintentional injury was among the top 10 causes of death for white seniors (114 deaths per 100,000), but not for African-Americans.⁴

Hospitalization

There were 294,690 hospitalizations of Missouri seniors in 2003. Heart and circulatory disease is by far the most common cause of hospitalization for seniors, followed by respiratory diseases and diseases of the digestive system (Figure VI-2).

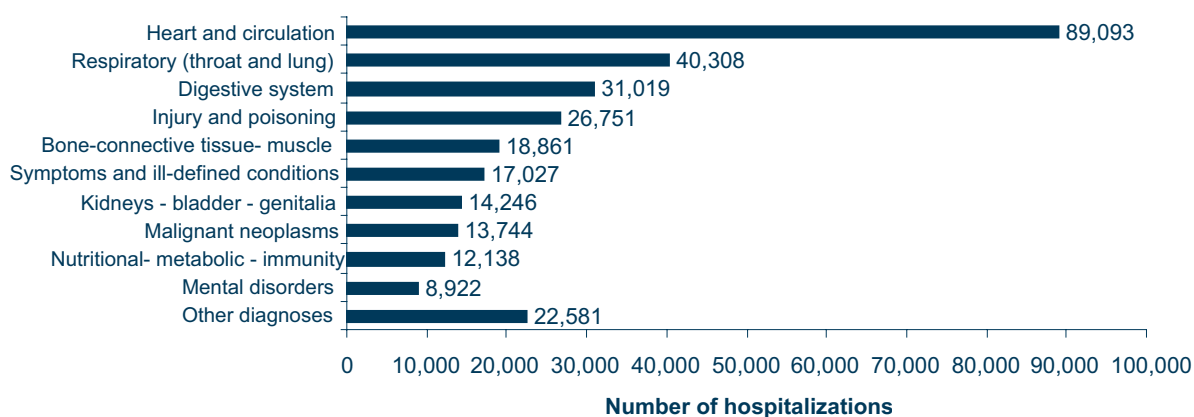
Health Problems and Potential Opportunities for Prevention

Chronic diseases influenced by health behaviors

Chronic diseases place a heavy health and economic burden on older adults, causing long-term illness, diminished quality of life, and greatly increased health care costs. CDC estimates that at least 80% of U.S. seniors have at least one chronic condition, and 50% have at least two.³ Nearly 40% of deaths in the U.S. can be attributed to smoking, physical inactivity, poor diet, or alcohol misuse—behaviors practiced by many people every day for much of their lives.⁶

Most of the leading causes of death of Missouri seniors are related to health behaviors (including heart disease, stroke, chronic lower respiratory disease, diabetes, lung and colorectal cancers). For example, in 2003, lung cancer caused the deaths of 1,524 Missouri men and

Figure VI-2. Leading causes* of hospitalization among seniors 65 years of age and over, Missouri residents, 2003



Source: DHSS, Hospital Discharge MICA (Missouri Information for Community Assessment), Available at http://www.dhss.mo.gov/D_C_DofCMICA/

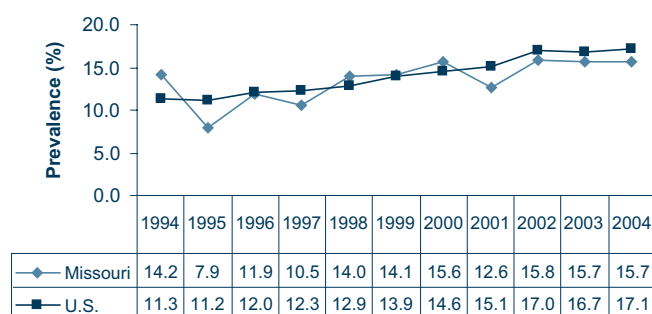
* Principal diagnosis

1,102 Missouri women age 65 and over,⁴ more than any other type of cancer deaths among both men and women. The National Cancer Institute estimates that 87% of lung cancer deaths are caused by smoking.⁷

As noted in previous chapters of this report, many Missourians do not practice healthy behaviors that can help prevent chronic diseases and the resulting lost productivity, disability and deaths. This is true of seniors as well, according to information about health habits and diseases collected through the Behavior Risk Factor Surveillance System (BRFSS).

Diabetes—In 2004, the BRFSS estimated that 16% of Missouri seniors had doctor-diagnosed diabetes, very similar to the national prevalence. The prevalence of diabetes is higher in this age group than in younger people, and it has increased slightly over the past decade (Figure VI-3). The prevalence is slightly higher for African-Americans than for whites in both Missouri and the U.S.

Figure VI-3. Prevalence of doctor-diagnosed diabetes among seniors 65 years of age and over; Missouri and the U.S., 1994-2004

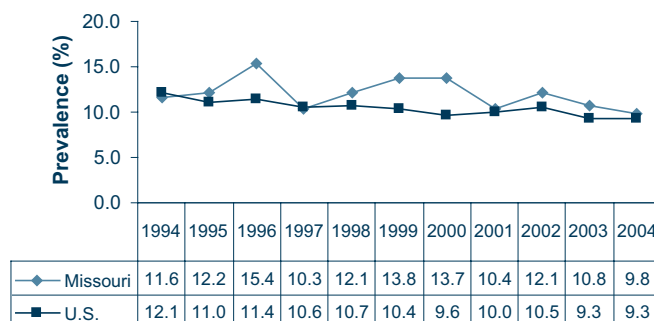


Source: Behavioral Risk Factor Surveillance System (BRFSS)

Tobacco use—Smoking prevalence among Missouri seniors is lower than younger Missourians. In 2004, about 10% of Missouri seniors reported being current smokers, close to the national rate (Figure VI-4). Many older people are former smokers. CDC estimated that in 2003, half of the people of all ages in the U.S. who have ever smoked have quit smoking.⁸

Smoking damages nearly every organ in the human body, causing many diseases and harming the general health of smokers. It harms the immune system and increases the risk of infections. Tobacco use is estimated to be responsible for one of every five deaths in Missouri. Smokers are much more likely to suffer from coronary heart disease, the leading cause of death in Missouri and the U.S., and lung cancer, the leading cause of cancer deaths. Although the effects of smoking may linger for several years, people who stop smoking can effectively reduce their risks for many chronic diseases compared with those who continue to smoke.⁹

Figure VI-4. Prevalence of current smoking among seniors 65 years of age and over; Missouri and the U.S., 1994-2004



Source: BRFSS

* Respondents who have ever smoked 100 cigarettes in their lifetime and reported smoking every day or some days

Obesity and overweight—The prevalence of obesity among Missouri seniors has increased significantly over the past decade (from 16% in 1994 to 21% in 2004), consistent with the national trend (Figure VI-5). Obesity is defined according to body mass index (BMI), which is a person's weight (in kilograms) divided by his or her height (in meters) squared. For example, a person who weighs 203 pounds (92 kilograms) and is 5'9" tall (1.75 meters) has a BMI of 30.0. A person with a BMI of 30.0 or more is considered to be obese.

African-American seniors are much more likely than white seniors to be obese both in Missouri (46% vs. 19% in 2004) and nationally (31% vs. 19% in 2004).¹⁰

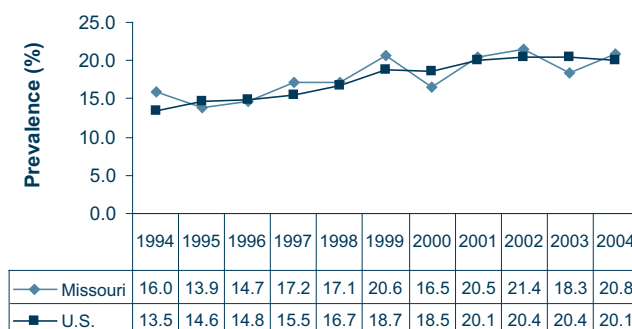
People with a BMI of 25-29.9 are defined as overweight. A large proportion (38%) of Missouri seniors were overweight in 2004, about the same as in 1994.¹⁰

Obesity contributes to many of the serious health problems of seniors, including heart disease and stroke, two of the three leading causes of death. Being overweight or obese also increases the risk of hypertension, high cholesterol, diabetes, arthritis, several types of cancer, and other diseases and conditions.

Low physical activity— People tend to be less active as they age. Almost two-thirds of Missouri seniors get less than the recommended amount of moderate or vigorous physical activity. In 2003, the most recent year this information was collected, 65% of Missouri seniors did not exercise enough (or at all), about the same as in the U.S. as a whole. This is a slight improvement over the 2001 percentage of 69%.



Figure VI-5. Prevalence of obesity* among seniors 65 years of age and over, Missouri and the U.S., 1994-2004



Source: BRFSS

* Body Mass Index (BMI) 30.0 or more

Not getting enough physical activity increases health risks. Regular physical activity greatly reduces a person's risk of dying from heart disease, and decreases the risk for colon cancer, diabetes, and high blood pressure. Physical activity also helps to control weight; contributes to healthy bones, muscles, and joints; helps to relieve the pain of arthritis; reduces symptoms of anxiety and depression; and can decrease the need for hospitalizations, physician visits, and medications. Physical activity does not need to be strenuous to be beneficial; people of all ages benefit from moderate physical activity.⁶

Low consumption of fruits and vegetables—Most seniors consume less than the recommended five servings per day of fruits and vegetables. In 2004, the proportion was 68% in Missouri, the same as the 2003 proportion in the U.S. (the 2004 U.S. data are not yet available). Unfortunately, adequate consumption of fruits and vegetables has decreased slightly among seniors over the last decade (64% reported not getting five servings a day in 1994).

Eating fruits and vegetables, which are rich in nutrients and low in calories, helps adults maintain a healthy weight and may help prevent colorectal cancer. People who eat few fruits and vegetables are likely to consume more calories in their daily diet.

What can be done to decrease the illness, disability, and death associated with chronic diseases? Some effective strategies are:

- Encourage seniors to adopt healthy behaviors, such as eating nutritious foods, being physically active, and avoiding tobacco use;⁶
- Provide assistance and support for communities to improve physical activity and nutritional habits, including environmental and policy changes, community coalitions and family-focused community activities;
- Improve health care providers' knowledge, skills and resources to enhance prevention, treatment, and management of weight;¹¹
- Train and encourage health care providers to counsel patients to quit smoking;
- Increase access to affordable smoking cessation services, which are more cost effective than many other common clinical services;⁹
- Encourage the use of appropriate screening tests for chronic diseases, including breast, cervical, and colorectal cancers, diabetes and its complications, and depression;
- Promote care management for seniors with chronic diseases, including helping seniors follow the doctor's orders, take medications as prescribed, etc.

Arthritis

Arthritis is the leading cause of disability in the U.S. Joint pain and stiffness are its characteristic symptoms. Osteoarthritis is the type that affects the most seniors.¹²

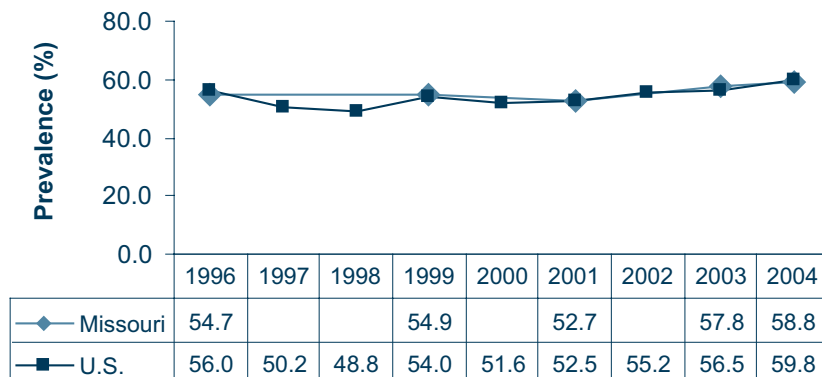
Osteoarthritis is the degeneration of cartilage and its underlying bone within a joint, as well as bony overgrowth. The process begins gradually, usually after age 40, and commonly affects the knees, hips, hands and spine. There is currently no cure. Cost-effective interventions are available to reduce the burden of arthritis, but they are currently underused.⁶

In the 2004 BRFSS survey, 59% of Missourians 65 years of age and over reported that they had physician-diagnosed arthritis. This is similar to the U.S. estimate of 60% (Figure VI-6). The prevalence of arthritis increases with age, and it is more common in women than men.

What can be done to reduce the pain and disability associated with arthritis? There are several approaches that help improve or maintain functioning and quality of life:

- Appropriate medication;
- Physical or occupational therapy;
- Maintaining a healthy weight, or losing weight, especially if the knees are affected;
- Patient self-management education and support;¹²
- Regular, moderate exercise, which can decrease disability by reducing joint pain and stiffness, building strong muscle around the joints, and increasing flexibility and endurance;⁶
- Surgical intervention in some cases.

Figure VI-6. Prevalence of doctor-diagnosed arthritis among seniors 65 years of age and over, Missouri and the U.S., 1994-2004*



Source: BRFSS

* Missouri data were not available for 1997-98, 2000, and 2002

Breast and prostate cancers

Of all the new cancer (excluding skin cancer) cases diagnosed every year among Missouri women 65 years of age and over, breast cancer is the most common type of cancer. (Accurate data on skin cancer are unavailable because not all types of skin cancer are reportable to the Missouri Cancer Registry.) In 2002, 2,076 cases of breast cancer were newly diagnosed among Missouri women in this age group.¹³ Breast cancer claimed 553 lives among Missouri women 65 years of age and over in 2003. The annual death rate from breast cancer in this age group has not changed much since 1999. The death rate is higher among African-American women than whites (177 vs. 120 per 100,000 in 2003).⁴ Early detection and treatment of breast cancer improve the chance of survival,

As with breast cancer in women, prostate cancer is the most common type of cancer (excluding skin cancer) diagnosed every year in Missouri men 65 years of age and over, with 2,049 newly diagnosed cases in 2002. The risk is highest in men aged 65-74 years.¹³ Prostate cancer caused 542 deaths in Missouri men 65 and over in 2003. There has been a slight downward trend since 1999, when there were 617 deaths in this age group. The death rate was considerably higher among African-American seniors than whites (292 vs. 166 per 100,000 in 2003).⁴

What can be done to decrease the burden of breast and prostate cancers?

- Educate health care providers and seniors to promote appropriate screening methods;
- Assure availability of mammograms for all women

at the recommended frequency for their age;

- Facilitate rapid referral for diagnostic testing for those with abnormal screening results;
- Make high-quality treatment available and accessible to seniors.

Pneumonia and influenza

Although great progress has been made in controlling infectious diseases in the past century, pneumonia and influenza are still among the most important causes of deaths for Missouri seniors. During 1994-2003, pneumonia and influenza combined was the fifth cause of death for Missouri seniors.⁴ In 2003, pneumonia and influenza were responsible for 1,455 deaths, or 3.5% of all deaths, among people 65 years of age and older in Missouri.⁴

The death rate due to pneumonia and influenza for seniors in Missouri in 2002 (194 per 100,000)⁴ was higher than in the U.S. as a whole (165 per 100,000).^{2, 5} During most years in the past decade, the rate for white seniors has been higher than that for African-American seniors in Missouri.⁴

There were a total of 18,870 hospitalizations of seniors due to pneumonia and influenza in Missouri in 2003. The number of hospitalizations per 10,000 in Missouri has fluctuated only slightly over the past ten years.¹⁴

Fortunately, effective vaccines are available for influenza and pneumococcal pneumonia. Influenza vaccination can reduce health care costs (physician visits, antibiotic use, and hospital stays) and the risk of life-threatening complications of influenza, including pneumonia. Pneumococcal vaccine reduces the risk of serious types of

pneumonia. Influenza vaccine must be administered annually, but the pneumococcal vaccine requires only one shot.

In 2004, 31% of Missouri seniors reported that they had not had an influenza shot in the last twelve months, according to the BRFSS data. This is close to the U.S. figure of 32% (Figure VI-7). About a third (33%) of Missouri seniors had never had a pneumonia shot; this is also close to the 35% in the U.S.

What can be done to decrease the risk of pneumonia and influenza?

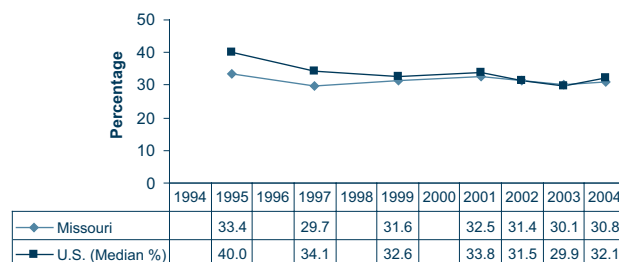
- Use every available means to encourage people 65 years of age and older to get an annual influenza immunization;
- Make influenza immunization readily available, accessible, and affordable for seniors and those who care for seniors;
- Encourage health care providers to review senior patients' pneumococcal immunization status and administer the vaccine to those who need it;
- Encourage long-term care facilities to immunize their patients.

Unintentional injuries

Unintentional injuries are the ninth leading cause of death among Missouri seniors, and the fourth leading cause of hospitalizations. There are two main causes of these injuries: motor vehicle crashes (MVC) and falls.

MVC - Nationally, motor vehicle-related deaths and injuries among older adults are rising.¹⁵ Drivers ages 65 and older who are injured in MVC are more likely than younger drivers to die from their injuries.¹⁶

Figure VI-7. Percentage of seniors age 65 years and over with no flu shot within 12 months, Missouri and the U.S., selected years between 1994 and 2004*



Source: CDC, BRFSS Online Prevalence Data, 1995-2004, available at <http://apps.nccd.cdc.gov/brfss/>

* No data for 1994, 1996, 1998, and 2000



MVC caused 232 deaths of Missourians 65 years of age and over in 2003, the highest number in a decade.⁴ Also, Missouri seniors had 4,746 emergency room (ER) visits and hospitalizations due to MVC in 2003, accounting for about 7% of the total ER visits and hospitalizations due to injuries in this age group.¹⁴

What can be done to decrease the number of injuries and deaths due to MVC among seniors? The Missouri State Highway Patrol has developed a variety of programs to help seniors drive safely. For example, troopers regularly speak to senior groups about occupant safety, defensive driving, and winter driving hazards. The State Highway Patrol also provides in-service training to troopers on how to recognize and interact with people who have Alzheimer's disease and other dementias.¹⁷ Also, any licensed physician, therapist, nurse, chiropractor, social worker, or psychologist by Missouri law may report to the department of revenue any patient having a disorder or condition that may prevent the patient from safely operating a motor vehicle.¹⁸ In addition, studies have suggested the following strategies:

- Increase the awareness of doctors caring for seniors about diseases that may affect driving ability (e.g., dementia, chronic obstructive pulmonary disease), and encourage them to report the cases to state authorities;
- Help seniors check with the pharmacist about the side effects and interactions of the medications that may affect their ability to drive safely (e.g.,

anti-depressants and opioid analgesics);

- Have their vision checked at least once a year;^{15, 19}
- Advocate and provide acceptable alternative transportation (e.g., sidewalks, public transit, and paratransit) to reduce miles driven;²⁰
- Establish policies to regulate the appropriate interval between license renewals for older drivers,²¹ and to make licensing decisions based on medical assessment;²²
- Improve vehicle designs with considerations of the needs of older drivers;²⁰
- Improve roadway designs (e.g., change highway signs to improve their legibility and visibility, and use more protected left turn operations).²⁰

Falls - Falls are the leading cause of injury deaths among people 65 years of age and over,²³ and the most common cause of nonfatal injuries and hospital admissions for trauma.²⁴ Each year, about 35-40% of seniors fall at least once.²⁵ Among those who fall, 20-30% suffer moderate to severe injuries such as hip fractures or head traumas, resulting in immobility and dependence²⁶ and increasing the risk of needing long-term care²⁷ and of premature death.²⁶

Seniors often have health conditions that make it difficult to maintain their balance.^{28, 29} Falls may also be caused by lower body weakness.²⁸ People taking four or more medications, or any psychoactive medications, are also at increased risk of falls.³⁰⁻³³

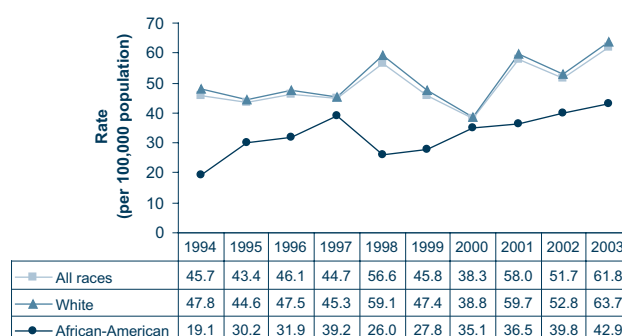
The majority of deaths due to injuries among Missourians 65 years of age and over result from falls. In 2003, falls caused 470 (56%) of the 842 unintentional injury deaths in this age group. The death rate among white seniors from falls is consistently higher than the rate among African-American seniors (Figure VI-8).

Falls are also a significant cause of ER visits and hospitalizations for people 65 years and over. In 2003, over 41,000 incidents related to falls and jumps occurred to Missouri seniors, accounting for almost two-thirds (63%) of all injury-related ER visits and hospitalizations in this age group.¹⁴ There has been an upward trend over the past decade (Figure VI-9). The rate of ER visits and hospitalizations due to falls/jumps is consistently higher among white seniors than African-American seniors (Figure VI-9).

What can be done to decrease the number of injuries and deaths due to falls among seniors? The following are some of the effective strategies:

- Increase lower body strength and improve balance through regular physical activity;³⁴⁻³⁶
- Ask their doctor or pharmacist to review all their medicines to reduce side effects and interactions;³¹
- See a health care provider regularly for chronic conditions that may increase the risk of falls (for example, Parkinson's Disease, arthritis, and cognitive impairment), and have their vision checked at least once a year;³⁷
- Reduce home hazards and make living areas safer by eliminating tripping hazards, slippery surfaces, unstable furniture and poor lighting, and installing railings or grab bars.³⁸⁻⁴⁰

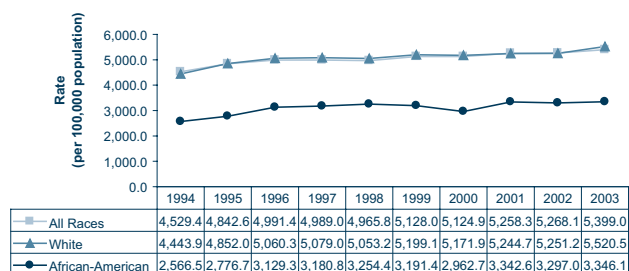
Figure VI-8. Death rate due to falls among seniors 65 years and over, by race, Missouri residents, 1994-2003*



Source: DHSS, MICA Death, available at <http://www.dhss.mo.gov/DeathMICA/index.html>

* Causes of death were classified using the Ninth Revision of the International Classification of Diseases (ICD-9) before January 1, 1999. ICD-10 has been used since 1999.

Figure VI-9. Rate of ER visits and hospitalizations due to falls/jumps among seniors 65 years and over, by race, Missouri residents, 1994-2003



Source: DHSS, MICA Injury, available at <http://www.dhss.mo.gov/InjuryMICA/>

Alzheimer's disease and other dementias

Alzheimer's Disease (AD) is the most common cause of dementia in older people. Dementia is a medical condition that disrupts the way the brain works. AD is a progressive brain disorder that gradually destroys a person's memory and ability to learn, reason, make judgments, communicate and carry out daily activities. As AD progresses, individuals may also experience changes in personality and behavior, such as anxiety, suspiciousness or agitation, as well as delusions or hallucinations.⁴¹

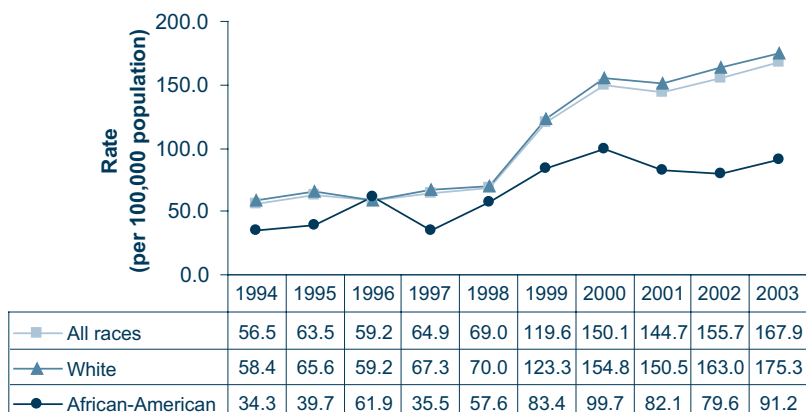
In the U.S., nearly 10% of all people over age 65, and up to half of those over age 85, are thought to have AD or another form of dementia. It is estimated that half of all nursing home patients suffer from AD. AD is very expensive, due to healthcare costs as well as the high costs of care-giving and long-term care. The average lifetime cost per AD patient is \$174,000.⁴²

AD is responsible for a growing number of deaths among Missouri seniors. Just between 2000 and 2003, the death rate due to AD had increased from 150 to 168 per 100,000 Missouri seniors (Figure VI-10). In 2003, AD was the sixth leading cause of death, causing 1,276 deaths for Missouri seniors. Missouri's death rate due to AD for seniors is slightly below the national rate (156 vs. 164 per 100,000 in 2002).^{2, 4, 5}

Exact figures on the prevalence of AD are not available. The Alzheimer's Association has estimated that about 110,000 Missourians have AD, and that this number will grow by 18%, to 130,000, by 2025. However, they also projected that the increase could be as much as 70% due to the rapidly growing population of people 65 years of age and over.⁴³

What can be done to reduce the number of people who develop Alzheimer's Disease, and to slow its progression? Unfortunately, the causes of AD are not well understood,

Figure VI-10. Death rate for Alzheimer's disease among seniors 65 years of age and over, Missouri residents, 1994-2003*



Source: DHSS, MICA Death, available at <http://www.dhss.mo.gov/DeathMICA/index.html>

* ICD-9 codes were used for death data before 1999; ICD-10 has been used since 1999. Counts of Alzheimer's disease deaths were about 50% larger than they would have been using ICD-9.

and the most significant risk factors seem to be age and family history of the disease. Medications are available that may temporarily delay the decline of memory for some people, but there is no long-term treatment or cure yet.⁴⁴ Some preliminary research findings suggest that general healthy aging may reduce the risk of AD. That includes:

- Controlling the risk factors that contribute to cardiovascular disease (weight, blood pressure, and cholesterol);
- Increasing physical activity;
- Becoming and staying socially active;
- Exercising the mind through reading, crossword puzzles and other activities;
- Identifying and treating other health problems that may contribute to memory loss and other symptoms of AD, such as depression, medication side effects, certain thyroid conditions, alcohol abuse and nutritional disorders.⁴⁴

Oral health

Many older adults experience problems with their teeth and gums that can seriously affect their quality of life. Oral diseases and conditions are common among people 65 years of age and over, who grew up without the benefit of community water fluoridation and other fluoride products.⁴⁵ Such problems include loss of teeth, periodontal (gum) disease, dental decay and oral and pharyngeal cancers.

According to CDC data, about 30% of adults 65 years old and older in the U.S. no longer have any natural teeth. The rate of toothlessness varies greatly by state.

Having missing teeth can affect nutrition, since people without teeth often prefer soft, easily chewed foods. Because dentures are not as efficient in chewing performance as natural teeth, denture wearers also may choose soft diets and avoid fresh fruits and vegetables.⁴⁵ In the 2004 Missouri BRFSS survey, 49% of seniors reported having lost six or more teeth. This percentage has been decreasing for the last several years, from 63% in 1997.

Access to dental care is a problem for many seniors. Many do not have dental insurance, especially older women. Medicare, the most common source of health insurance for seniors, does not cover routine dental care. Seniors with the poorest oral health are those who are economically disadvantaged, lack insurance and are members of racial and ethnic minorities. Seniors who are disabled, homebound, or institutionalized are also more likely to have poor oral health.⁴⁵

In Missouri, only about two-thirds (66%) of people 65 years of age and over reported they had their teeth cleaned by a dentist or dental hygienist in the last year, according to the 2004 BRFSS data; nationally, this figure is 73%.

Health Care for Seniors

The availability, accessibility and cost of health care are major concerns for seniors. Most seniors have chronic conditions that require medical attention.

Insurance status of seniors

Missouri seniors almost universally have health care coverage, with less than 1% uninsured, the lowest of any age group. The vast majority (97% in 2004) are covered by government health insurance, mostly Medicare.⁴⁶ However, Medicare coverage was not designed to cover dental care or ongoing needs such as pharmaceuticals, community-based services and long-term care.

Medicaid expenditures for seniors

Low-income seniors who have exhausted their financial resources become eligible for Medicaid coverage in Missouri. In federal fiscal year 2004 (October 2003-September 2004), an estimated \$1.24 billion was spent through the Missouri Medicaid program to provide care for 91,010 people 65 years of age and older. This was an average annual cost of \$13,646 per senior beneficiary. The largest category of expenditures (50% or \$623 million) was for nursing facility care, followed by pharmacy costs (24% or \$295 million) and costs of personal support services (9% or \$115 million). Inpatient hospital service accounted for 2% of the total, or \$27 million. About 25% of total Missouri Medicaid payments in federal FY2004 were for senior care.⁴⁷

Medicare payments

Medicare is the national health insurance program primarily for senior people aged 65 years and older. People under 65 years of age with certain disabilities, and those with end-stage renal disease (permanent kidney failure requiring dialysis or a kidney transplant) are also eligible for Medicare.⁴⁸

In July 2001, 867,063 Missourians were enrolled in Medicare.⁴⁹ An estimated \$4.76 billion was spent for Medicare benefit payment in Missouri in federal fiscal year 2001.⁵⁰ This means the average annual Medicare benefit payment is about \$5,484 per Medicare enrollee.

Community-based vs. nursing home care

According to data provided by the Division of Senior and Disability Services of DHSS, community-based care for seniors is much more cost-effective than nursing home care. Many seniors with chronic conditions can be cared for at home, with the proper mix of community-based services. Based on FY04 data, the Division of Senior and Disability Services of DHSS calculated that the average annual cost for in-home services was \$6,076 per client, compared with \$28,578 for nursing facility care per resident.

What can be done to reduce the costs of health care for seniors?

- Strengthen the focus on healthy lifestyles and prevention of illness at all life stages, so people stay healthy longer;
- Promote the use of care management for people with chronic diseases;
- Increase the accessibility of community-based services, and improve the system of referrals for in-home care options;
- Facilitate the sharing of medical records among health care providers by the use of electronic medical records;
- Improve the ways drugs are dispensed, through the use of electronic prescribing and alert systems for medication regimens.

Infectious Diseases

Infectious diseases are caused by microorganisms, which are transmitted through the environment, animals, and/or people. They affect all age groups and social classes. The history of infectious disease control and prevention in the 20th century has mostly been a success story. Deaths from infectious diseases in the U.S. and Missouri have declined remarkably. Control of infectious diseases has partially contributed to a sharp drop in infant and child mortality and to a 30-year increase in life expectancy in the U.S. during the 20th century.¹

In 1900, the top three leading causes of death were pneumonia, tuberculosis (TB), and diarrhea and enteritis, which (together with diphtheria) caused one third of all deaths. Today, however, a much smaller percentage of deaths are due to infectious diseases.² For example, in 2002, only 4.7% was attributable to pneumonia, influenza, septicemia, and human immunodeficiency virus (HIV) infection, whereas heart disease and cancers accounted for 51.3% of all deaths.³ This progress was mainly due to a number of public health advances during the past 100 years, including improvements in sanitation and hygiene, the discovery of antibiotics, and the implementation of universal childhood vaccination programs. Scientific and technologic advances have played a major role in each of these areas and are the foundation for today's disease surveillance and control systems.²

Major challenges still remain, however. For example, two major pandemics of communicable diseases — influenza in 1918 and the acquired immunodeficiency syndrome (AIDS) epidemic — occurred in the 20th century, killing millions of people worldwide. New diseases emerge constantly (e.g., the epidemic of Severe Acute Respiratory Syndrome or SARS during 2002-2003), and diseases thought to be under control re-emerge. Diseases previously confined in isolated geographic locations or populations spread to other locations and populations due to societal events, human behaviors, environmental changes, adaptation of microorganisms, and changes in public health infrastructure. Controlling their spread depends upon a strong system for public health protection.



Mortality and Leading Causes of Death

Few infectious diseases are among the leading causes of death in Missouri and the U.S. Only pneumonia/ influenza and septicemia are among the top ten (see “Key Population Health Indicators,” page 12). Table VII-1 shows the leading infectious causes of death in Missouri.

Table VII-1. Leading causes of death due to infectious diseases, Missouri residents, 2003

Cause of Death	Number of deaths	Death rate (per 100,000)	Age-adjusted death rate* (per 100,000)
Pneumonia & influenza	1,624	28.5	25.7
Septicemia	734	12.9	11.9
Viral hepatitis	130	2.3	2.2
AIDS (HIV disease)	124	2.2	2.2

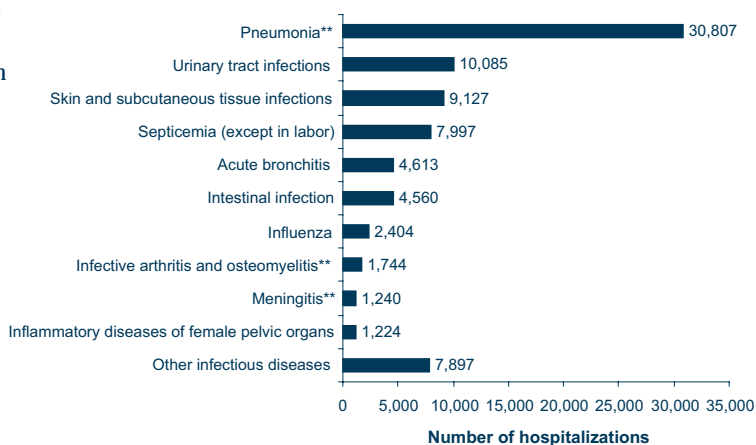
Source: Missouri Department of Health and Senior Services (DHSS), MICA (Missouri Information for Community Assessment) Death, available at <http://www.dhss.mo.gov/DeathMICA/index.html>

* Age adjustment used the U.S. 2000 standard population

Hospitalization

There were 81,698 hospitalizations of Missouri residents in 2003 due to infections, which made up 11% of the total hospitalizations that year. Of the hospitalizations due to infections, 38% were due to pneumonia, 12% due to urinary tract infections (12%), and 11% due to infections of the skin and subcutaneous tissue (Figure VII-1).

Figure VII-1 Infectious disease* hospitalizations, Missouri residents, 2003



Source: DHSS, MICA Hospital Discharge, available at http://www.dhss.mo.gov/D_C_DofCMICA/

* Principal diagnosis

** Except that caused by tuberculosis or sexually transmitted disease

Reportable Diseases

The public health system plays an active role in tracking, preventing and controlling the spread of certain diseases called “reportable diseases” that are designated by the Code of State Regulations. Health care providers and laboratories are required to report cases of these diseases to DHSS when they are identified.⁴ Not all infectious diseases are reportable by law. For example, many of the leading infectious causes of hospitalization (e.g., skin infections, pneumonia) are not reportable, since they do not require direct public health intervention. The most commonly reported diseases in 1995 and 2004 are shown in Table VII-2.

Two of the top reportable diseases, gonorrhea and chlamydia, are sexually transmitted diseases that have

been discussed in more detail in the previous chapter “Adults (Age 18-64 Years),” page 65.

Table VII-2. Top ten most frequently reported infectious diseases, Missouri, 1995 and 2004

1995		2004	
Reportable diseases	Number of cases	Reportable diseases	Number of cases
Chlamydia	12,084	Chlamydia	21,319
Gonorrhea	11,302	Gonorrhea	9,218
Hepatitis A	1,338	Influenza (confirmed)	4,346
Syphilis, Total	1,271	Campylobacteriosis	745
Shigellosis	1,138	Salmonellosis	628
HIV/AIDS	824	Pertussis	595
Giardiasis	761	Giardiasis	578
Campylobacteriosis	601	HIV/AIDS	467
Salmonellosis	577	Syphilis, Total	268
Influenza (confirmed)	491	Hepatitis B, Acute	187

Source: DHSS, Communicable Disease Surveillance

Health Problems and Potential Opportunities for Prevention

Pneumonia and influenza

Pneumonia and influenza are severe diseases of the respiratory system. They are important causes of hospitalization and death in Missouri and in the nation. People 65 years of age and over, and those with chronic diseases (such as heart disease, diabetes, and lung disease) are at highest risk of dying from pneumonia and influenza. Influenza also causes widespread epidemics among people of all age groups each year, resulting in increased health care costs, and causing school absenteeism and lowered worker productivity, in addition to physical discomfort, hospitalization, and death.

The reportable disease system does not mandate reporting of pneumonia cases, and does not give a true picture of influenza since only laboratory-confirmed cases are counted. Therefore, a more complete picture comes from the hospitalization and death data given earlier. For more information about the impact of these diseases on older adults, please see the previous chapter “Seniors (Age 65 Years and Older),” pages 73-74.

Fortunately, effective vaccines are available for influenza and pneumococcal pneumonia. Annual influenza immunizations can reduce health care costs (physician visits, antibiotic use, and hospital stays) and the risk of life-threatening complications of influenza, including pneumonia. Pneumococcal vaccination reduces the risk of serious types of pneumococcal infection caused by the invasion of bacteria into the blood stream (such as

septicemia, meningitis and invasive pneumococcal pneumonia).

What can be done to decrease the risk of pneumonia and influenza? The most important way is to make influenza and pneumococcal immunization readily available, accessible, and affordable for those who need it. Recommendations from the Centers for Disease Control and Prevention (CDC) are updated annually.

CDC recommends that the following groups of people receive influenza vaccine annually:⁵

- People 65 years of age and over, especially those with chronic health conditions;
- Residents of long-term care facilities;
- People 2-64 years of age with chronic health conditions;
- Children 6-23 months of age;
- Pregnant women;
- Health care workers;
- Household contacts and caregivers of infants under 6 months of age;
- Household contacts of children and adults who are at high risk of complications from influenza;
- Healthy children and adults.

In recent years there have been problems with the influenza vaccine supply. When that happens, health authorities prioritize the groups that should receive the

vaccination first. Specific recommendations are issued by CDC annually.

Pneumococcal vaccine is recommended by CDC for:⁶

- People 65 years of age and over;
- People with serious chronic health conditions such as heart disease, sickle cell disease, alcoholism, diabetes, liver cirrhosis, and lung disease other than asthma;
- People with lowered resistance to infections due to HIV/AIDS or other medical conditions or treatments.

Pneumococcal immunization should be incorporated into routine medical care for these groups, and especially for residents of long-term care facilities.

Tuberculosis

Tuberculosis (TB) is a disease caused by bacteria called *Mycobacterium tuberculosis*. The bacteria usually attack the lungs, but may attack other parts of the body. If not

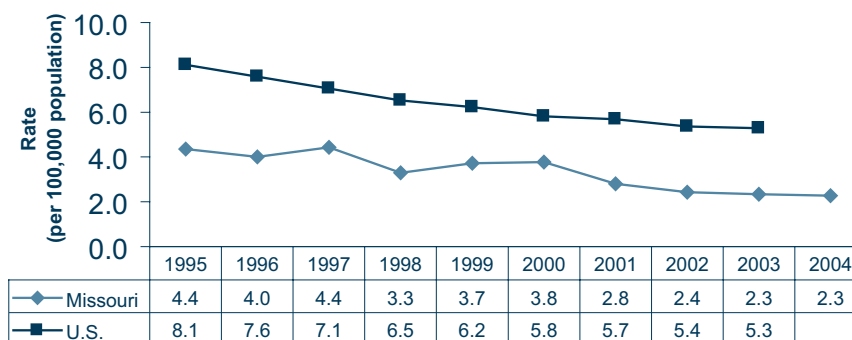
treated properly, TB disease can be fatal. TB disease was once the leading cause of death in the U.S., and it is still a leading killer worldwide.

TB is spread through the air when a person with active TB disease of the lungs or throat coughs or sneezes. People nearby may breathe in these bacteria and become infected. An infected person may develop active TB disease, or may have a latent TB infection, without any symptoms. Latent TB infection may develop into active disease later in life, at which time the person can transmit the disease to others.

Treatment with specific antibiotics can usually cure active TB disease. People with latent TB infection can be treated with antibiotics so that they will not develop active TB disease.

Fortunately, due to diligent public health intervention, TB cases in the U.S. and in Missouri have been decreasing.⁷ In 2003, Missouri's rate was 2.3 per

Figure VII-2. Rate of reported tuberculosis cases, Missouri and the U.S., 1995-2004



Source: DHSS, Office of Surveillance. Bioterrorism, Communicable Disease, and Environmental Surveillance 2004 Annual Report, available at <http://www.dhss.mo.gov/CommunicableDisease/Annual04/Annual04.pdf>

100,000, considerably lower than the national rate of 5.3 (Figure VII-2).

There were 127 new cases of TB reported in Missouri in 2004, a rate of 2.3 per 100,000. People 60 years of age and over accounted for 39% of all cases, with a rate of 5.0 per 100,000.⁸

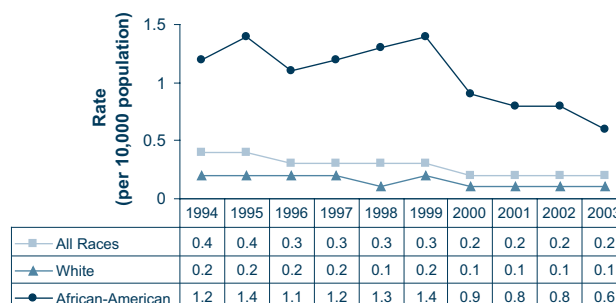
The hospitalization rate of TB disease has decreased in recent years as well. Still, the hospitalization rate among African-Americans was six times higher than among whites in 2003 (Figure VII-3).

Deaths from tuberculosis are relatively rare. The annual number of deaths due to TB disease during the last decade has ranged between 9 and 23. There were 16 deaths in 2003, compared with 17 in 1994.⁹

What can be done to decrease the risk of tuberculosis? CDC recommends the following measures:¹⁰

- A strong surveillance system to identify each new case of active TB disease;
- Follow-up by local public health agencies to assure that each patient receives appropriate medical treatment;
- Outreach to all contacts of the patient who may have been exposed to TB, with testing and, if needed, treatment and follow-up services provided;
- Close collaboration between health care providers, public health agencies and community agencies to prevent and control TB;
- Targeted screening and prevention activities for high-risk populations.

Figure VII-3. Hospitalization rate for tuberculosis cases, age-adjusted, Missouri residents, 1994-2003*



Source: DHSS, MICA Hospital Discharge,
http://www.dhss.mo.gov/D_C_DofCMICA/

* Tuberculosis as principal diagnosis; age adjustment used the U.S. 2000 standard population

Foodborne illnesses

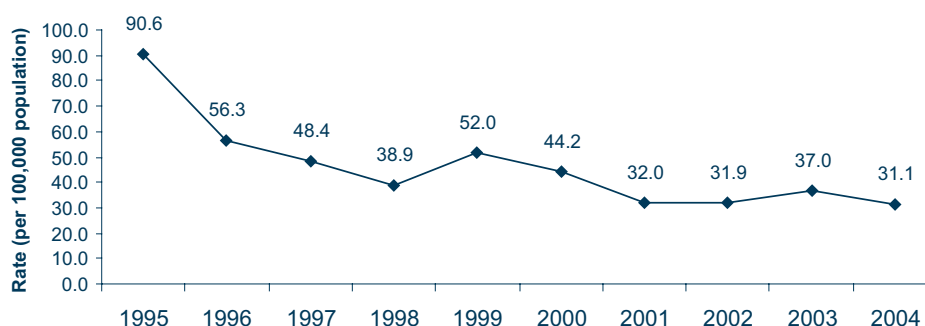
Many people do not think about food safety until a food-related illness affects them or a family member. While the food supply in the U.S. is one of the safest in the world, CDC estimates that 76 million people get sick, more than 300,000 are hospitalized, and 5,000 Americans die each year from foodborne illnesses. Preventing foodborne illnesses and death remains a major public health challenge.¹¹

Several of the most common reportable diseases are infections that may be transmitted through food or by close personal contact with an infected person. The category of foodborne diseases includes botulism, campylobacteriosis, *E. coli* O157:H7, hepatitis A, hemolytic uremic syndrome (HUS), listeriosis, salmonellosis, shigellosis, trichinosis, typhoid fever, and yersiniosis.

Most of these diseases cause gastrointestinal symptoms (diarrhea, vomiting, fever, etc.); in rare occasions they can cause serious complications. Incidence of these diseases has declined over the past decade (Figure VII-4), in part due to increased public attention and public health interventions to improve food safety.

In 2004, the most-reported foodborne diseases in Missouri were campylobacteriosis (745 cases) and salmonellosis (628 cases).¹² Both of these diseases are caused by bacteria, which usually come from contaminated animal products such as meat, poultry and raw milk. Children 12 years of age and under accounted for 230 cases of salmonellosis (37% of all cases) in Missouri, with a rate of 23 per 100,000 (vs. 11 per 100,000 in all age groups).⁸

Figure VII-4. Rate of reported cases of foodborne diseases, Missouri, 1995-2004



Source: DHSS, Communicable Disease Surveillance

Another important foodborne disease is *E. coli* O157:H7. There were 98 cases of this disease reported in 2004; 51 (52%) of them were children 12 years of age and under. The *E. coli* bacteria that cause this infection come from animal products. Infection with *E. coli* O157:H7, or with certain strains of shigella and other bacteria, can cause hemolytic uremic syndrome (HUS), a serious complication that affects the kidneys. There were 19 cases of HUS in Missouri in 2004, 17 of them in children 12 years of age and under.⁸

One other disease frequently transmitted through food, as well as personal contact, is hepatitis A, caused by a virus. The reported incidence of hepatitis A declined sharply over the past decade due to the introduction of an effective vaccine, which has been widely used among children and food handlers in many cities and counties that previously had high rates of hepatitis A, and for people who travel to less developed countries.¹³ The number of hepatitis A cases in Missouri in 1995 was 1,338, but in 2004 there were only 34 reported cases.¹²

What can be done to decrease the risk of foodborne diseases? CDC and other federal, state, and local agencies recommend the following measures:

- Educate consumers about handling food safely at home;
- Educate food handlers throughout the food distribution system about how to handle food safely;
- Encourage/require food production and processing industries and retailers to develop and follow procedures that minimize food contamination;
- Coordinate a system of inspection and testing throughout the food chain, to assure the safety of the food supply.

Consumer education to promote food safety emphasizes four simple steps to minimize risk:¹⁴

- Clean food preparation surfaces, utensils and hands;
- Separate raw foods from cooked foods;
- Cook foods to temperatures that are adequate to kill bacteria;
- Chill foods to temperatures that slow bacterial growth.

Viral hepatitis

Viral hepatitis is a serious illness caused by viruses that damage the liver. In addition to hepatitis A, discussed earlier, the two most common types of viral hepatitis are hepatitis B and hepatitis C. These viruses are transmitted from one person to the other through contact with blood and other body fluids, including sexual contact.

Hepatitis B can cause lifelong infection, cirrhosis (scarring) of the liver, liver cancer, liver failure, and death. Some people experience acute illness when they are newly infected, but most infections are silent until symptoms develop many years later. The chances of developing a chronic infection vary, with the highest risk (90%) in infants exposed at birth. Death from chronic liver disease occurs in 15-25% of chronically infected people.¹⁵

Fortunately, the reported incidence of acute hepatitis B has declined over the past several years, from 437 cases in 1995 to 187 in 2004.¹² The number of hospitalizations in Missouri has been low during the past decade, ranging from 42 to 75 per year between 1994 and 2003.¹⁶ Annual deaths have ranged from 5-17 per year during the period 1995-2004.¹⁶

What can be done to reduce the number of hepatitis B infections? Three factors have contributed to the decline in hepatitis B infections:

- Wide use of a safe and effective vaccine;
- Implementation and enforcement of precautions against exposure to blood and body fluids in the health care workplace; and
- Screening of the blood supply for hepatitis B virus (already in place).

The vaccine is helping to protect future generations from hepatitis B infection. Infants are now routinely immunized against hepatitis B. Immunization is required for school attendance, and healthcare workers routinely receive the vaccine. Since the risk of chronic infection is greatest in young people and the number of susceptible young people is declining, deaths from hepatitis B should continue to decline.

Acute hepatitis C is also a reportable disease. Hepatitis C is not as easily transmitted as hepatitis B. Before 1992, most hepatitis C infections were due to blood transfusion. In recent years, long-term kidney dialysis, needle sharing during injecting drug use, or exposure at birth account for a large proportion of the new

infections. Sexual contact or needle stick injuries are rare causes of infection. Most hepatitis C infections are “silent” at first, but a high percentage develop into chronic infections, and 70% of chronically infected people develop liver disease.¹⁷ Because most people do not know they are infected until they develop chronic liver disease, no reliable data are available on the incidence of this disease.

Hospitalizations due to hepatitis C in Missouri increased more than three-fold from 58 in 1994 to 185 in 2003.¹⁶ Deaths have increased from 44 in 1999 (the earliest year that comparable data are available) to 114 in 2004.¹⁶

What can be done to reduce the number of hepatitis C infections? There is no vaccine to protect against hepatitis C currently, but there are important precautions:

- Decrease injecting drug use and needle sharing;
- Implement and enforce workplace precautions against exposure to blood and body fluids in the healthcare setting;
- Routinely screen the blood supply and transplant organs of hepatitis C (already in place).

Missouri's Health Care System

The health of Missourians is affected by many things that have been discussed in earlier chapters. Regardless of age or life stage, however, all Missourians' health is impacted by the availability and accessibility of quality health care. Good access to health care can help to prevent diseases through services such as immunization, well child screenings and exams, screening and treatment for risk factors such as hypertension and high cholesterol, and other preventative services. It also helps to identify potentially life-threatening conditions (such as cancer) early, so they can be treated successfully. In addition, it provides early intervention and treatment to limit the negative consequences of chronic diseases such as diabetes and arthritis. Further, it can help prevent simple infections (such as upper respiratory infection, simple wound) from becoming serious infectious diseases (e.g., pneumonia, septicemia). Moreover, it helps to manage chronic diseases and conditions and to improve the quality of life.

This chapter focuses on some aspects of the health care system that are important to the health of the population as a whole. Since insurance coverage has been discussed in the Chapter "Key Population Health Indicators" and in several other chapters, that information will not be repeated here.

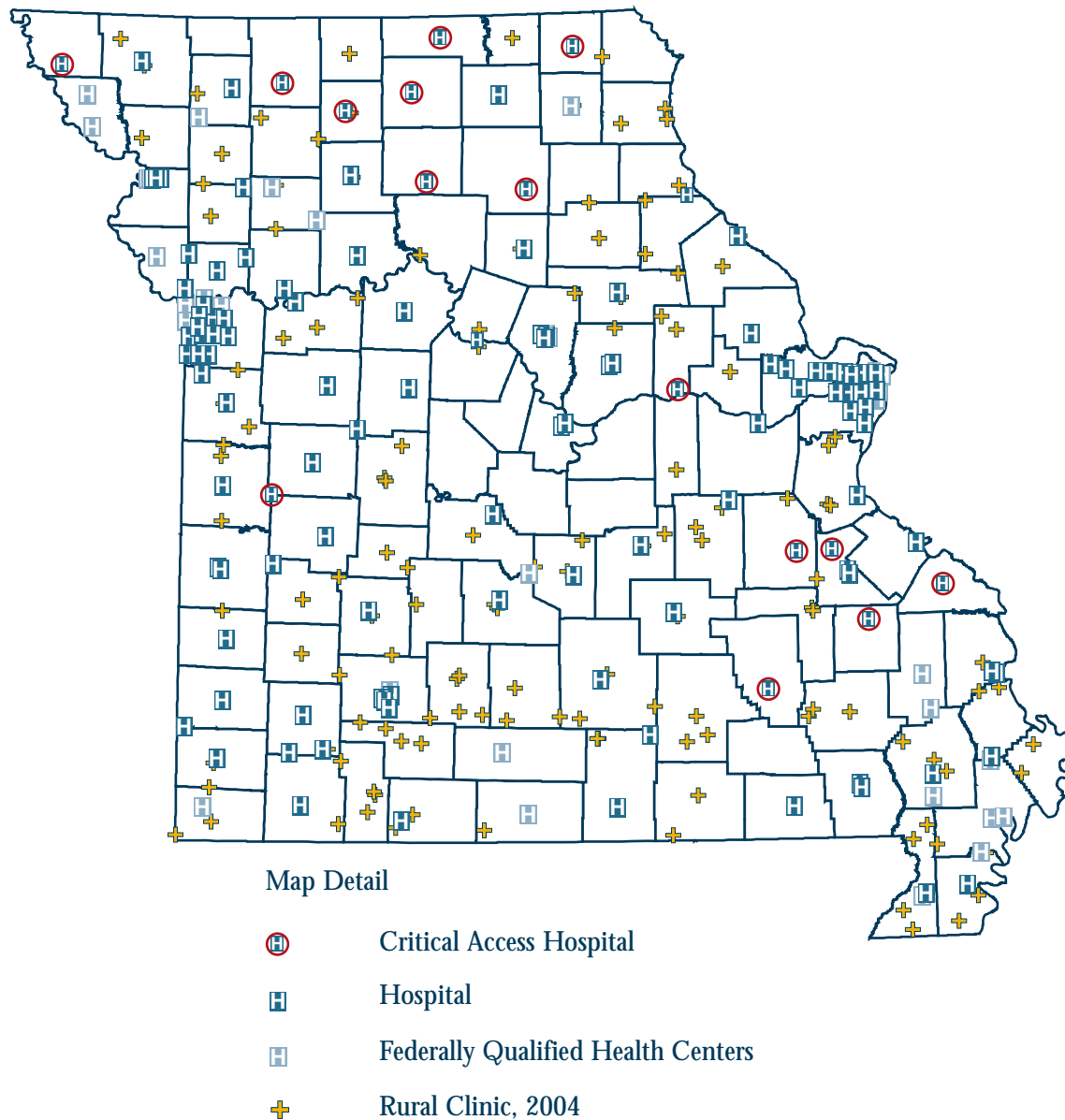


Health Care Facilities

Missouri has many excellent health care facilities, but not all areas of the state have ready access to such facilities. Figure VIII-1 shows the distribution of hospitals, community health centers, and rural health centers in the state. Community and rural health centers provide primary care services and referrals to specialty care, and make them available on a sliding fee scale. They provide an important access point for health services that might not be otherwise available to low-income, uninsured individuals. However, many Missouri counties do not have such a facility.



Figure VIII-1. Medical facilities of Missouri*



Source: Missouri Department of Health and Senior Services

*Facility information does not include every type of medical provider; 2004 data for rural clinics and 2005 data for other three types of facilities.

Emergency Medical Services System

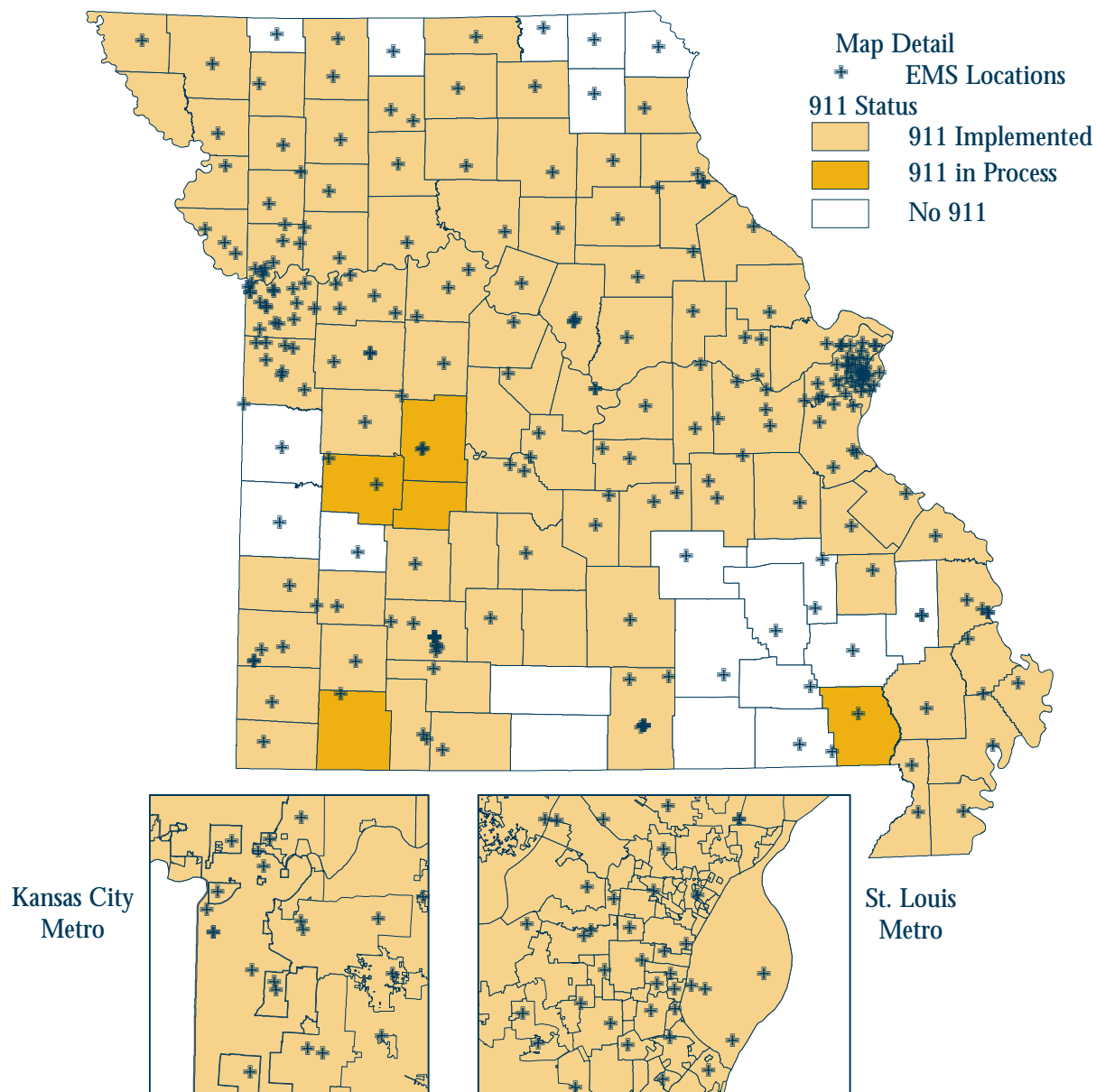
There are 215 ground and 14 air transport services in Missouri. There are approximately 30 emergency medical responder agencies that provide initial care, but no transportation. The total number of dispatch agencies within the state is unknown, but there are currently 25 counties that have no 911 services at all: five of those counties are in the process of attaining 911 services. The percentage of dispatch agencies that provide pre-arrival instructions to callers is unknown, but thought to be less than 50%. Figure VIII-2 shows

the distribution of Emergency Medical Services (EMS) and status of 911 services around the state.¹

Currently, the majority of the areas in the state are covered by advanced life support EMS, but the viability of many of these individual services is in question due to proposed and already-implemented cuts in reimbursement rates. The main advisory body is the State Advisory Council on EMS, which provides a forum for many stakeholders within the state, in cooperation with six regional EMS committees.¹



Figure VIII-2. Missouri Emergency Medical Services (EMS) and status of 911 services, 2005



Source: Missouri Department of Health and Senior Services, Geographical Information Systems (GIS) Network Data

Primary Care Physicians

Primary care physicians are generalists who often serve as a patient's first point of contact with the health care system. The U.S. Health Resources and Services Administration, Bureau of Health Professionals (BHPR) provides criteria for determining whether an area has a shortage of primary care physicians to meet the population's needs. These include service areas with less than 20% of the population below poverty that has less than one full-time primary care physician per 3,500 people, and those with greater than 20% of the population below poverty that has less than one full-time primary care physician per 3,000 people. An area that meets one of these criteria, and has no contiguous resources available within a travel time of 30 minutes, may be designated as a Geographic Health Professional Shortage Area (HPSA).²

Even if an area does not meet the criteria for a Geographic HPSA, there may not be enough primary care physicians who are serving the low-income population. BHPR has also established a formula for determining if an area qualifies as a Low Income HPSA. The formula involves the number of people below 200% of poverty and the number of full time equivalent primary care physicians who serve them (based on Medicaid and sliding-fee scale encounters).

Many areas of Missouri have been designated by BHPR as Geographic HPSAs and Low-Income HPSAs, as shown in Figure VIII-3. People who live in these areas do not have optimal access to primary care physician services.

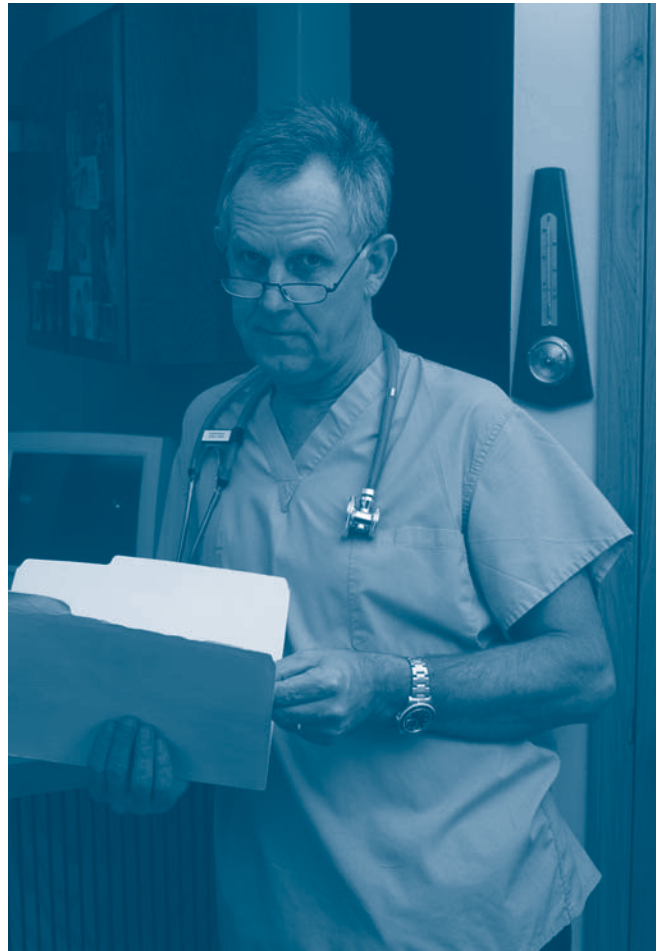
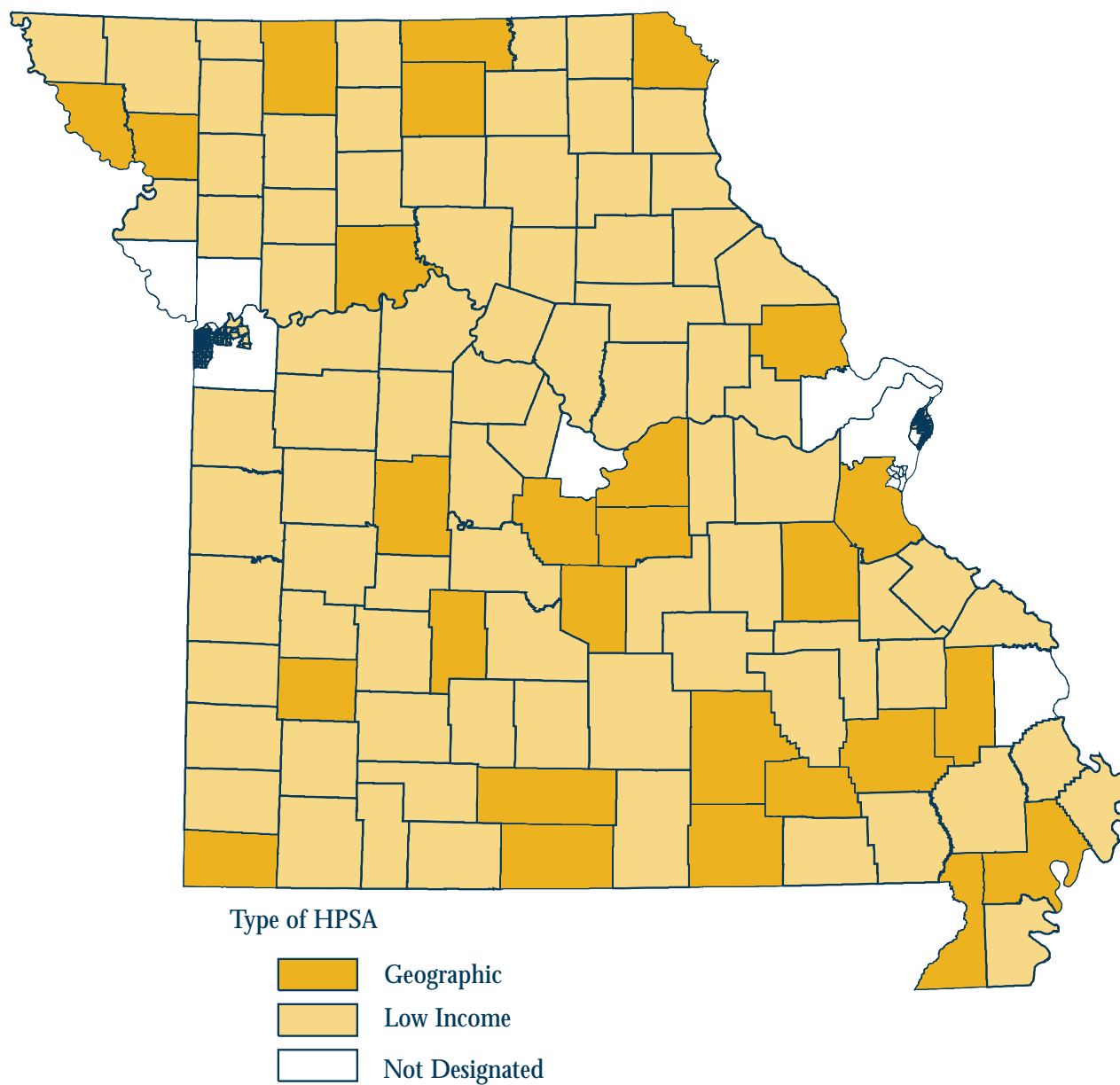


Figure VIII-3. Primary Care Health Professional Shortage Areas (HPSAs), Missouri, January 2005



Source: Missouri Department of Health and Senior Services, Office of Primary Care and Rural Health

Dental Health Care Providers

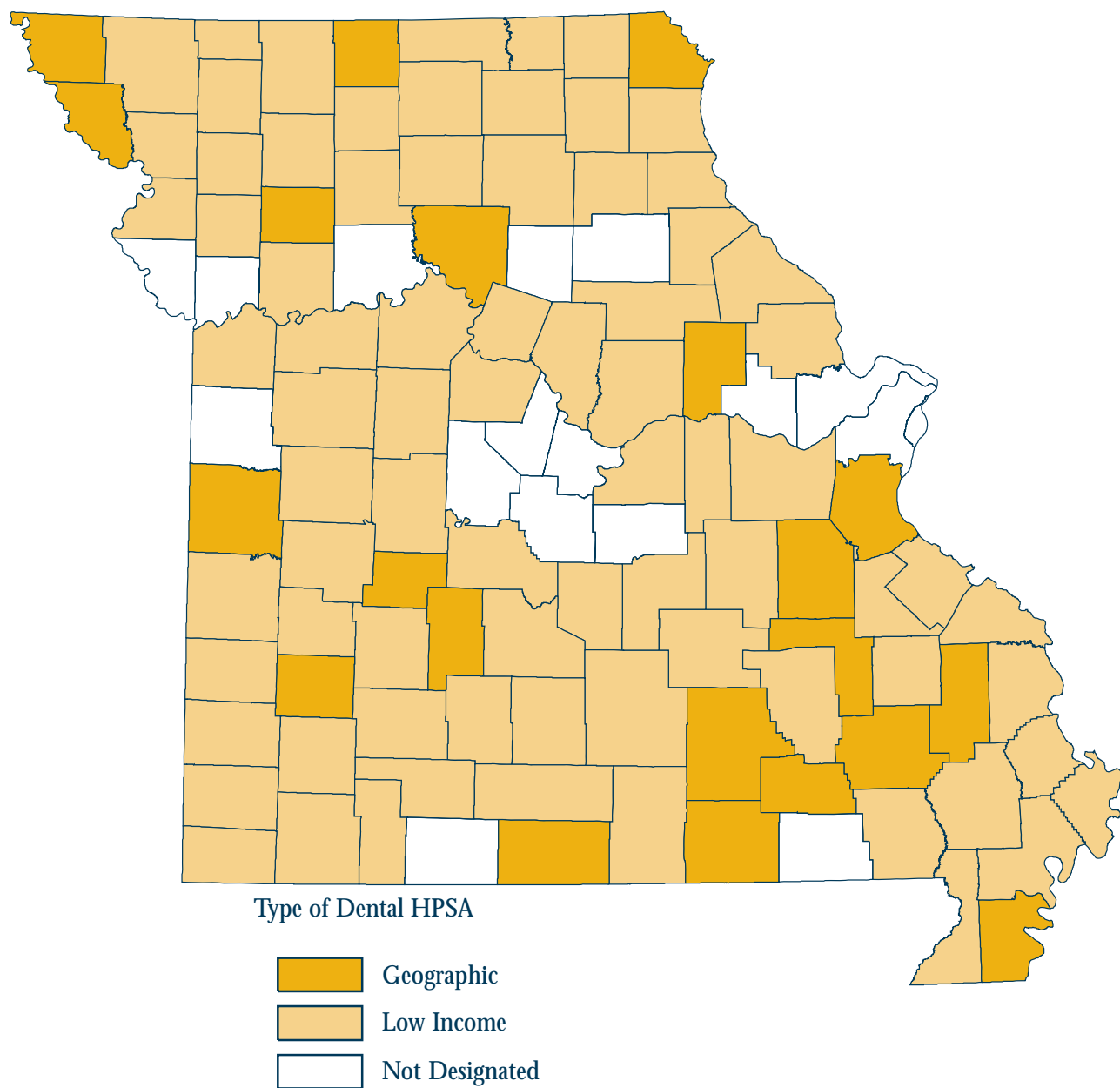
Access to dental services is also important to the health and quality of life for Missourians. Oral health problems range from cavities to cancer, and cause pain and disability for millions of Americans. BHPR also provides criteria for determining whether an area has a shortage of dentists to meet the population's needs. A Geographic Dental Health Professional Shortage Area may be determined if a service area with less than 20% of the population below poverty has less than one full-time dentist per 5,000 people, or a service area with more than 20% of the population below poverty has less than one full-time dentist per 4,000 people. Criteria are also based on the percentage of the population that has a fluoridated water supply and also whether contiguous resources are available within a travel time of 40 minutes.³

Even if an area does not meet the criteria for a Geographic Dental HPSA, there may not be enough dentists who are serving the low-income population. BHPR has also established a formula for determining if an area meets the criteria to be designated as a Low Income Dental HPSA.

As Figure VIII-4 shows, many areas in Missouri have been designated as Dental HPSAs. People who live in these areas do not have optimal access to dental services. Many of the counties that are not designated as Dental HPSAs are in the process of being reviewed to determine eligibility.



Figure VIII-4. Dental Health Professional Shortage Areas (HPSAs), Missouri, January 2004



Source: Missouri Department of Health and Senior Services, Office of Primary Care and Rural Health

The Public Health System

The public health system in Missouri consists of the Missouri Department of Health and Senior Services (DHSS) and 114 local public health agencies (LPHAs) in cities and counties throughout the state. These agencies are responsible for protecting the health of their citizens and provide a wide and varying range of services. They receive funding from local taxes, fees, contracts with DHSS, and grants from other sources. Some essential services, referred to as “core public health functions,” are provided by all LPHAs in the state. These services are partially funded by DHSS from general revenue. They include:

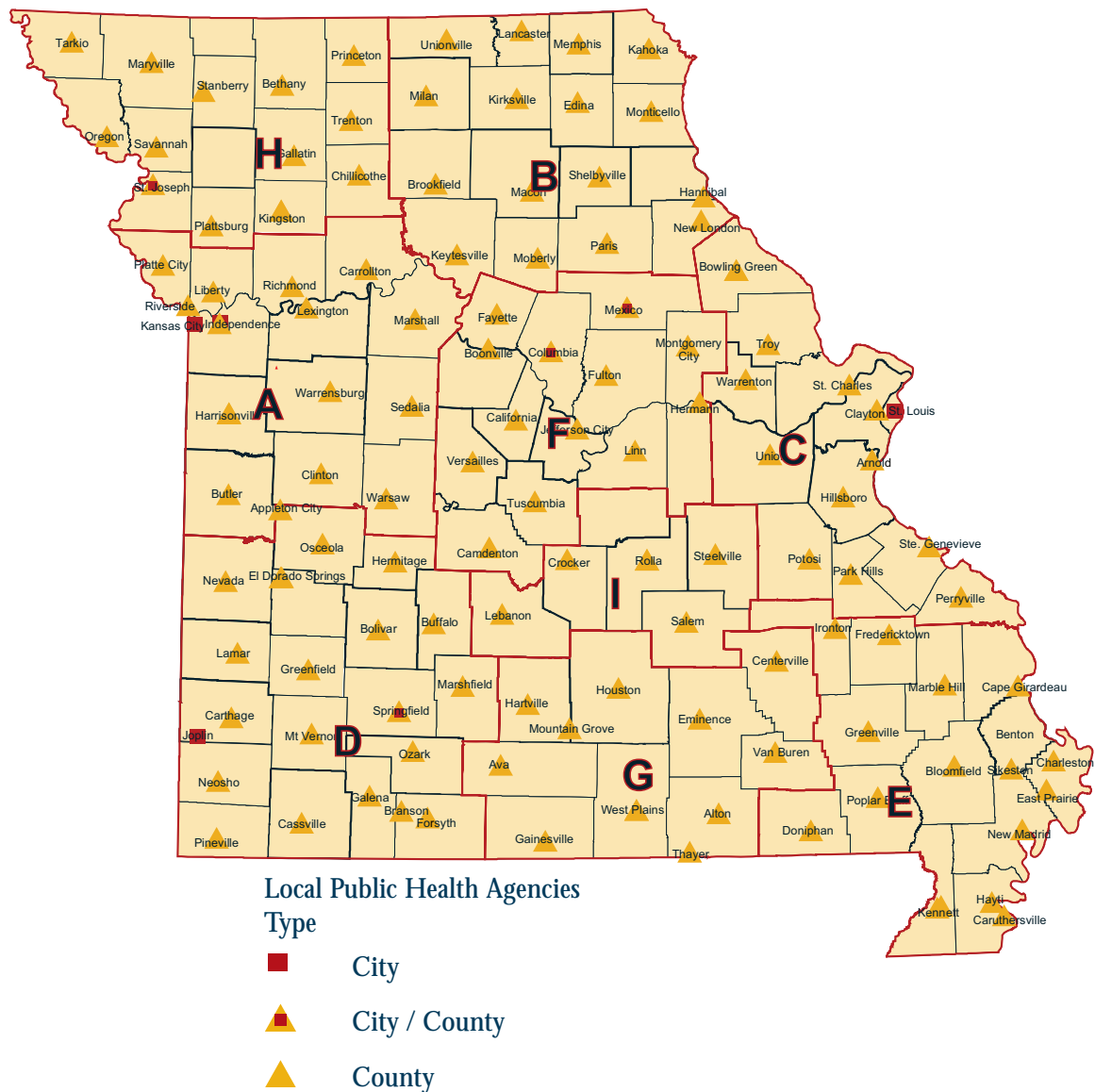
- Issuance of vital records (birth and death certificates);
- Communicable disease surveillance, investigation and follow-up;

- Environmental sanitation services such as food safety education and inspection of food processors, retail food establishments, lodging establishments, and onsite sewage systems;
- Planning, preparation, and public health response to emergencies, including natural disasters, mishaps that may taint the food supply (e.g. food truck wrecks or fires in food establishments), and acts of bioterrorism;
- Assessment of the local population’s health status, and leadership to coordinate needed services in communities.

The distribution of LPHAs around the state is shown in Figure VIII-5, along with the boundaries of the state’s Emergency Response Planning Regions.



Figure VIII-5. Local Public Health Agencies (LPHAs) and Health Emergency Response Planning Regions, Missouri



Source: Missouri Department of Health and Senior Services, Geographic Health Emergency Response Mapping Dataset

Special Supplemental Nutrition Program for Women, Infants and Children (WIC)

Another key public health service provided throughout the state is the Special Supplemental Nutrition Program for Women, Infants and Children (WIC). This program is funded by the U.S. Department of Agriculture and administered by DHSS through contracts with local public health agencies, community action agencies and other service providers.

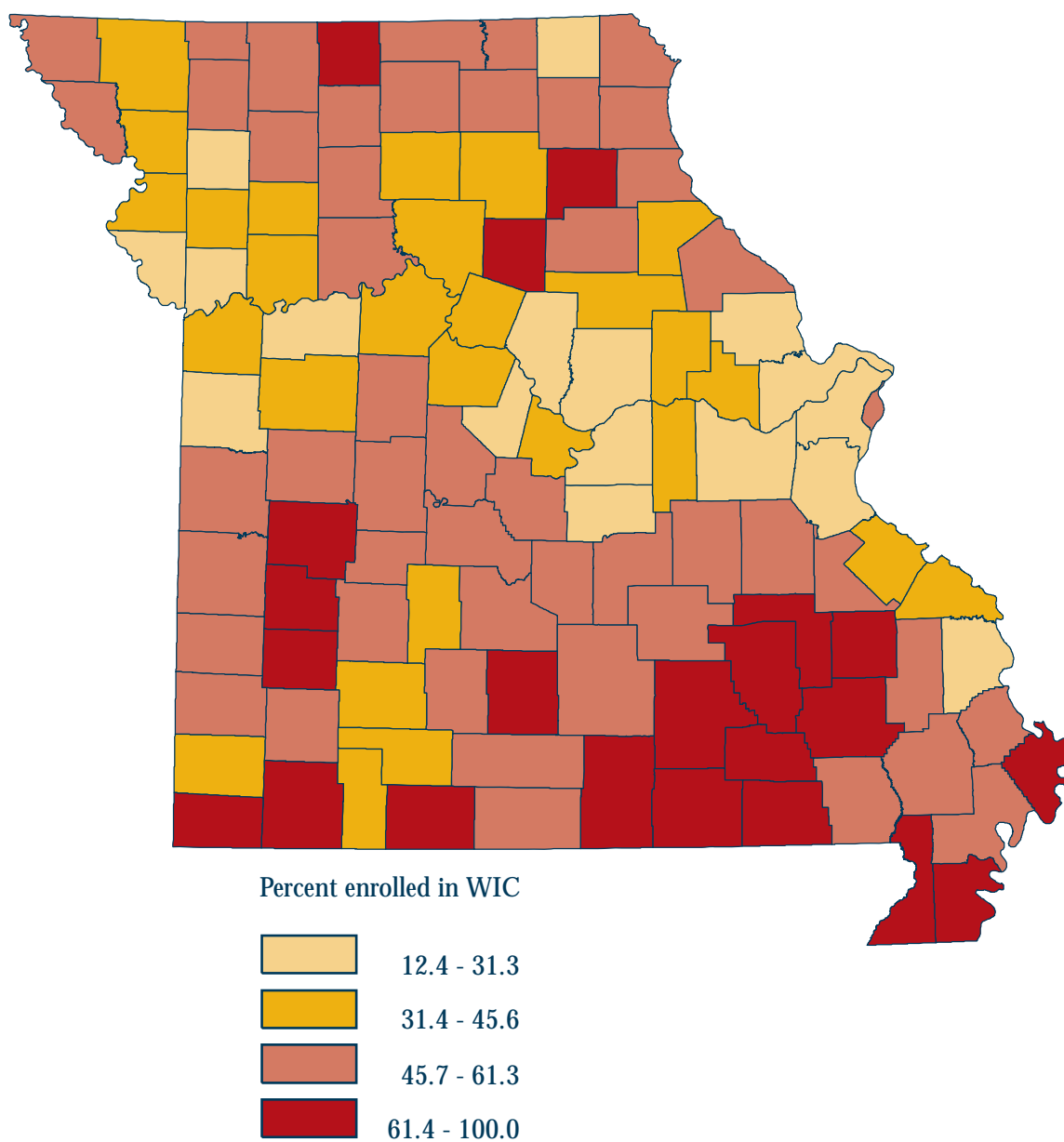
The purpose of the WIC program is to provide nutritious foods to supplement the diets of pregnant women, new mothers, infants, and children up to five years of age. The program also provides nutrition counseling and access to some health services.

Participation is based on income and on nutrition-related medical risk factors. WIC participation has been shown to improve the nutritional status of women and children, and to be cost-effective.⁴

In 2003, 37% of all infants and children at age less than 5 years in Missouri were enrolled in WIC.^{5, 6} The percentage of WIC participation by county is shown in Figure VIII-6.



Figure VIII-6. Infants and children aged <5 years enrolled in WIC program (%), by county, Missouri, 2003



Source: Missouri Department of Health and Senior Services (DHSS), 2003 Pediatric Nutrition Surveillance; DHSS, MICA (Missouri Information for Community Assessment) Population, available at <http://www.dhss.mo.gov/PopulationMICA/>

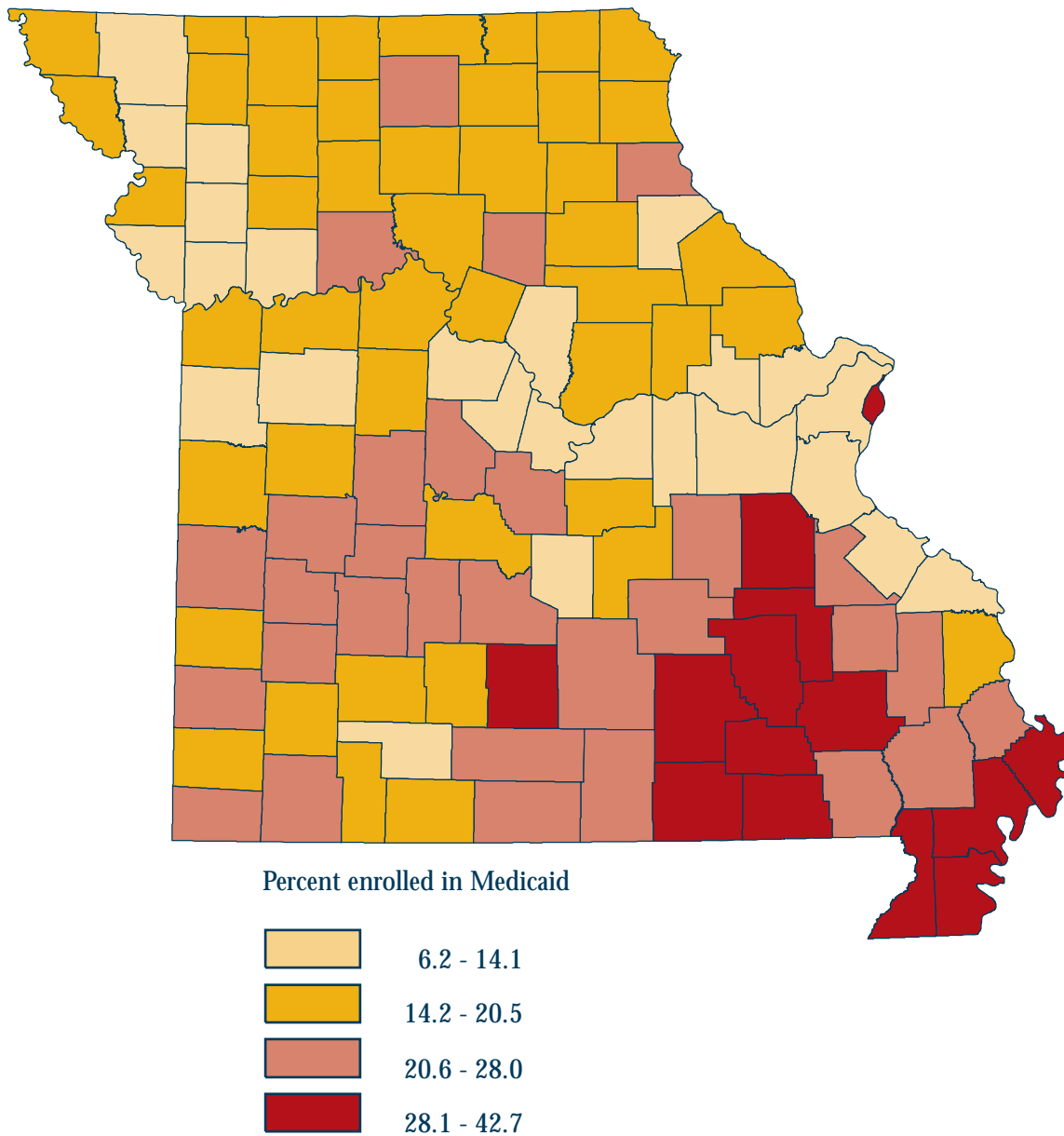
Medicaid Enrollment

The Medicaid program is a federal/state partnership designed to provide health care coverage for Missourians who are uninsured and do not have the means to pay for health care. Most Medicaid participants are children, disabled persons, and seniors.

The percentage of the population enrolled in Medicaid varies among Missouri counties (Figure VIII-7). The highest percentages are in the City of St. Louis and several counties in the southeastern part of the state.



Figure VIII-7. Missouri Medicaid enrollment (%) by County, 2005



Source: Missouri Department of Social Services, Division of Medical Services; U.S. Census Bureau, Population Division, available at <http://www.census.gov/popest/counties/tables/CO-EST2004-01-29.xls>

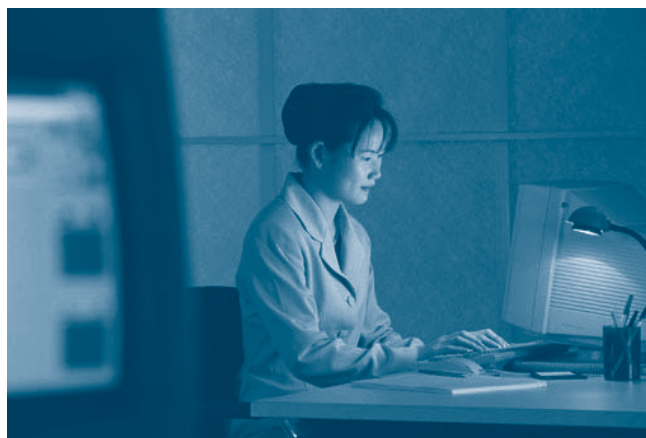
Surveillance and Data Gaps

The Missouri-specific information contained in this report was collected from many different sources, including the vital records (birth and death certificates), hospital databases (discharge diagnoses), reportable disease surveillance systems (infectious diseases and cancer), Behavioral Risk Factor Surveillance System (BRFSS), other surveys (e.g., Youth Risk Behavior Surveillance System, Youth Tobacco Survey, Health Care Insurance and Access Survey), and U.S. Census.

To yield reliable, useful information, a data source should be population-based; that is, it should draw information either from the entire population or from a sample that represents the population. A good data source or “surveillance system” should also be:

- Ongoing—collects comparable data year after year;
- Sensitive—able to detect the events it is looking for;
- Timely—collects and analyzes data when it is needed;
- Accurate—categorizes the data correctly, records it right, and avoids duplication;
- Efficient in its use of resources.

Missouri has a wealth of information about people’s health, but there are still several gaps that make it difficult to see the whole picture.



Childhood Overweight

No population-based system exists to determine the trends in children's weight. The data presented in this report come from clients of the Special Supplemental Nutrition Program for Women, Infants and Children (WIC) and participants in the Missouri School-Aged Children Health Service Program (MSCHSP). Neither of these groups necessarily represents the entire population of Missouri children.

The apparent increase in the number of children who are overweight or at risk for overweight [see the previous Chapter "Infants and Children (Age 0-9 Years)," pages 35-36] has huge implications for Missouri's health in the future. Complete, accurate information about weight trends in children is therefore a high priority data need, and a surveillance system should be developed.

Diabetes

Diabetes is an important chronic disease that causes serious complications and disability. The only available information about the prevalence of diabetes comes from the BRFSS [see the previous Chapter "Adults (Age 18-64 Years)," page 54]. It consists of a single question about whether the person has been diagnosed by a physician as having diabetes. Even though the BRFSS is representative of the population 18 years of age and over, this information is very insufficient about a disease that has such a serious, lifelong effect on overall health. The prevalence of the different types of diabetes or its complications is unknown. No data are available on diabetes prevalence in children, or age at onset. A more complete surveillance system is needed so health care

providers and communities can use it to guide diabetes education, prevention, treatment and services.

Insurance Coverage for Children

General information about health insurance coverage is available from the U.S. Census, but it is based on a small sample of Missourians. Figures are reported for all children under 18; a more detailed age breakdown is not available. The 2004 Missouri Health Care Insurance and Access Survey¹ was not designed to specifically sample families with children, so it does not provide detailed, regional information about children. Little is known about what types of insurance coverage children have, except for Medicaid. More detailed information would be helpful to guide policy decisions and efforts to assure that children receive the health care they need to grow up healthy.

Occupational Health

In 2002, there were 5,524 occupational fatalities in the U.S. across all industries, and over 4.7 million new nonfatal injuries and illnesses reported in private industry alone, according to the Centers for Disease Control and Prevention (CDC).² CDC's National Institute of Occupational Safety and Health (NIOSH) gathers information from various sources to make these estimates. NIOSH collects data related to anxiety, stress, and neurotic disorders, bloodborne infections and percutaneous exposures, fatal injuries, hearing loss, lead toxicity, musculoskeletal disorders, nonfatal injury, disorders due to physical agents, poisoning, respiratory diseases, and skin diseases and disorders.

Missouri, like many other states, has not yet developed the critical infrastructure needed to support fundamental occupational health and safety surveillance programs. While various Missouri agencies participate in gathering some of this data, these efforts are fragmented and incomplete. Current data collection systems rely on passive reporting by medical providers and laboratories, so occupational illnesses and injuries are under-reported. There is no strong system to pull together and analyze information about occupational injuries and deaths collected by various state agencies. Such a system is needed to help guide efforts to prevent work-related illness, injury, disability and death.

The Bureau of Labor Statistics (BLS) estimates that a total of 5.2 million injury and illness cases occurred within the nation's private sector workforce in 2001, for an estimated incidence rate of 5.7 cases per 100 full-time-equivalent (FTE) workers. The estimated 2001 Missouri rate was somewhat higher at 6.1 per 100 workers. Work-related injuries and illnesses are preventable, and the key to prevention is to control hazards in the workplace. Data trend analyses are needed to evaluate the effectiveness of occupational illness and injury prevention programs, including regulations to protect workers.^{3, 4}

Each year, nearly 6,000 cases of work-related fatalities in the U.S. are reported to the BLS. On an average day, 16 workers die as a result of injuries sustained at work. In 2002, 175 Missouri workers died due to workplace injury or illness, which was the highest count reported

since the program began in 1993. The 2002 state rate was 6.2 per 100,000 FTE, higher than the U.S. rate of 4.0 per 100,000. Surveillance of work-related fatalities can identify hazards and case clusters and lead to the development of new interventions and prevention programs, including regulations to protect workers.^{3, 4}

Environmental Health

Many aspects of the environment affect people's health. Exposure to air and water pollution, hazardous substances, heavy metals, carbon monoxide, and chemicals including pesticides and herbicides can have serious health effects.⁵

In Missouri, elevated blood lead levels and illnesses related to certain chemicals are reportable conditions. There is a well-developed system for surveillance of lead poisoning in children and adults, which is funded in part by CDC. However, systematic information about other environmental health problems is limited. The state reporting requirements are not widely known or understood, and this results in under-reporting of acute poisoning incidents. In addition, many of the effects of environmental exposures are chronic health problems, not acute incidents.

Despite recent efforts to pull together existing information sources, DHSS does not have a well-developed program for environmental health surveillance. This leaves many gaps in our knowledge of the public's health status and of potential preventive measures for improvement.

Oral Health

Mouth and throat diseases, which range from cavities to cancer, cause pain and disability for millions of Americans. This is disturbing because almost all oral diseases can be prevented.

Cavities are a common problem that begins in early childhood and continues throughout life. Tooth loss continues to be a problem among adults and seniors. In addition, oral cancers pose a threat to the health of American adults. Each year, about 28,000 people in the U.S. learn that they have mouth and throat cancers, and nearly 7,200 die of these diseases.⁶ In 2003, 150 Missouri residents died of cancers of the lip, oral cavity or pharynx.⁷

We know very little about the oral health status of Missouri's population. The BRFSS collects minimal information about adults' loss of teeth and recent preventive care.

Access to dental care appears to be limited, but the extent of the need is not well documented. A crude measurement of access to dental services is provided by the Health Professional Shortage Designations. However, this is not a population-based measure. DHSS is currently working with the University of Missouri School of Dentistry to develop a population-based oral health need model to evaluate the need for preventive services, by age, gender, and some disease conditions, as well as access to fluoridated water.⁸

Population-based data on children's oral health are also limited. An open mouth survey of third- (and sometimes sixth-) graders is completed every five years for the Maternal and Child Health Block Grant activities.

Results from the latest survey conducted in 2005 indicate that 54% of Missouri's third-graders have experienced caries, and 25% have untreated decay. However, currently there are no other surveillance systems in place. DHSS is initiating a program that could provide annual surveillance data on children in childcare facilities, head starts and kindergarten through high school in participating communities.⁸

There are currently no surveillance systems to assess the oral health needs for adults, especially for the vulnerable elderly population in Missouri.⁸

Healthcare System

This report has used available information to give a snapshot of the healthcare system in Missouri. However, we do not have data that would allow us to compare the adequacy of our system to national standards or the systems of other states. There are federal criteria for Primary Health Care and Dental Health Care Professional Shortage Areas (see the previous Chapter "Missouri's Health Care System," pages 94-97), but standards for the availability and accessibility of other healthcare services are not well defined. For example, a wide range of service levels are provided by the various ambulance services within the state, but more information and analysis are needed to determine which areas of the state are adequately covered and which are not. We also lack high quality data to evaluate Missouri's healthcare system over time.

Appendix. Definitions and Data Sources

<u>Alcohol/Substance Abuse among High School Students in Grades 9-12</u>	<u>Medicaid Expenditures for Seniors</u>
<u>Cancer Incidence</u>	<u>Medical Facilities in Missouri</u>
<u>Childhood Elevated Blood Lead Level</u>	<u>Medicare Estimated Benefit Payment</u>
<u>Childhood Immunization Coverage</u>	<u>Mental Disorders</u>
<u>Death Rate</u>	<u>Minority Population</u>
<u>Disability Status</u>	<u>Missouri Emergency Medical Services</u>
<u>Educational Attainment</u>	<u>Moderate or Vigorous Physical Activity</u>
<u>Emergency Room Visits</u>	<u>Overweight and Obesity</u>
<u>Emergency Room Visits and Hospitalizations due to Injuries</u>	<u>Poverty</u>
<u>Foodborne Diseases</u>	<u>Prenatal Care</u>
<u>Health Insurance Coverage</u>	<u>Prevalence</u>
<u>Health Professional Shortage Area</u>	<u>Reportable Diseases</u>
<u>Hospitalizations</u>	<u>Self-reported Arthritis</u>
<u>Household Income</u>	<u>Self-reported Diabetes</u>
<u>Infant Mortality Rate</u>	<u>Teen Birth Rate</u>
<u>Leading Causes of Death</u>	<u>Tobacco Use</u>
<u>Life Expectancy</u>	<u>Vaccine Preventable Diseases</u>
<u>Low Birth Weight and Very Low Birth Weight</u>	<u>Years of Potential Life Lost Before Age 75 Years</u>
<u>Low Consumption of Fruits and Vegetables</u>	

Alcohol/Substance Abuse among High School Students in Grades 9-12

Episodic heavy alcohol drinking indicates having had 5 or more alcoholic drinks in one sitting, on one or more of the 30 days prior to the survey

Current Marijuana use indicates using marijuana one or more times during 30 days prior the survey.

Inhalant use includes sniffing glue, breathing the contents of aerosol spray cans, or inhaling paints or sprays to get high, one or more times during their life

Data Source: Youth Risk Behavior Surveillance System (YRBSS)

NOTE: The Youth Risk Behavior Survey (YRBS) conducted every two years, is population-based data, and includes national, state, and local school-based surveys of representative samples of 9th through 12th grade students. Students in the national sample (50 states and the District of Columbia) completed a self-administered questionnaire. Self-reported information is collected. For more information on YRBSS, visit: www.cdc.gov/nccdphp/dash/yrbs

Cancer Incidence

Cancer incidence data are from the Missouri Cancer Registry (MCR). Newly-diagnosed cancer cases among Missouri residents and residents of other states/territories/countries are reported to Missouri Department of Health and Senior Services (DHSS) by hospitals throughout the state where cancer is diagnosed and/or treated.

Cancer incidence rate is calculated by dividing number of newly-diagnosed cancer cases in a year by the midyear resident population, and expressed by number of cancer cases per 100,000 resident population. For census years (1990 and 2000), rates are based on census counts of the resident population, as of April 1. For the noncensus years, rates were based on national estimates of the resident population, as of July 1.

Age-specific cancer incidence rate is expressed as the annual number of newly-diagnosed cancer cases in a given age group per 100,000 resident population in that age group.

The *International Classification of Diseases for Oncology* (ICD-0-2) codes and the major and minor cancer site groups of the Surveillance, Epidemiology, and End Results (SEER) program were used to define cancer sites.

More information regarding the MCR data can be found under <http://www.dhss.mo.gov/CancerMICA/MICACancertext.htm>.

Data Source

Missouri: DHSS, Missouri Information for Community Assessment (MICA) Cancer, available at <http://www.dhss.mo.gov/CancerMICA/index.html>

Childhood Elevated Blood Lead Level

Blood lead levels are measured and reported as micrograms of lead per deciliter of whole blood ($\mu\text{g}/\text{dL}$). For children aged less than six years, elevated blood lead level (EBL) of at least 10 $\mu\text{g}/\text{dL}$ is the level of concern recommended by the Centers for Disease Control and Prevention (CDC).

Missouri data was based on statewide surveillance system of Childhood Blood Lead Screening and Risk Data pertaining to children under 6 years of age reported by private and state and local government laboratories. Proportion of lead poisoning for children under 6 years of age is calculated by dividing the number of children under 6 years of age who were screened for lead poisoning with EBL of at least 10 µg/dL by the number of children screened.

National Health and Nutrition Examination Surveys (NHANES) data are used in this report to describe the burden (prevalence) of EBL among young children 1-5 years of age throughout the United States.

Data Sources

Missouri: Missouri Department of Health and Senior Services (DHSS), Childhood Lead Poisoning Prevention Program (CLPPP), Missouri Childhood Blood Lead Screening and Risk Data, available at <http://www.dhss.mo.gov/ChildhoodLead/Reports.html>. For more information regarding CLPPP, please go to <http://www.dhss.mo.gov/ChildhoodLead/>

U.S.: NHANES, available in “Meyer PA et al. Surveillance for elevated blood lead levels among children—United States, 1997-2001”¹

Childhood Immunization Coverage

4:3:1 vaccination series refer to four doses of diphtheria, tetanus toxoids and pertussis vaccines, diphtheria and tetanus toxoids, or diphtheria, tetanus toxoids and any acellular pertussis vaccine (DTP/DT/DTaP); three or more doses of poliovirus vaccine; and one or more doses of any measles-containing vaccine (MCV), including measles-mumps- rubella vaccine (MMR).

Data Source

Missouri and U.S. data for children at age 19-35 months: National Immunization Survey (NIS)

NOTE: The NIS is a large, ongoing telephone survey of households with age-eligible children followed by a mail survey of the children's vaccination providers to validate immunization information. The NIS is used to obtain national, state, and selected urban area estimates of vaccination coverage rates for U.S. children between the ages of 19 and 35 months. For more information on NIS, please go to <http://www.cdc.gov/nip/coverage/default.htm#NIS>

Death Rate

Death rate is calculated by dividing the number of deaths in a year by the midyear resident population, and expressed by number of deaths per 100,000 resident population. For census years (1990 and 2000), rates are based on census counts of the resident population, as of April 1. For the noncensus years, rates were based on national estimates of the resident population, as of July 1.

Age-specific death rate is expressed by the annual number of deaths in a given age group per 100,000 resident population in that age group.

Age-adjusted death rate. For overall population, age-adjusted death rates were presented. The age adjustment used the U.S. 2000 standard population. They were computed by the direct method by applying age-specific death rates per 100,000 in a population of interest to a relative age distribution of a standard population. Age-adjusted death rates are used to compare relative mortality risks among groups and over time. However, they should be viewed as relative indices rather than as actual

measures of mortality risk. More information on age adjusting is available at <http://www.cdc.gov/nchs/data/statnt/statnt06rv.pdf> and on the choice of standard population at <http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>

Data Sources

Missouri data: age-adjusted death rates for overall resident population were obtained through Missouri Department of Health and Senior Services (DHSS), Missouri Information for Community Assessment (MICA) Death;² age-specific death rates were derived from number of resident deaths for specified age groups (i.e., 1-9, 10-17) in a year obtained through “MICA Death”² and population estimates for the same year and the same age groups available through “MICA Population”³

U.S. data 2002: age-adjusted death rates for overall resident population were extracted from “Deaths: final data for 2002”;⁴ age-specific death rates were based on number of resident deaths for specified age groups (i.e., 1-9, 10-17) in a year obtained through “CDC WONDER- Leading causes of death”⁵ and the U.S. population estimate for the same year and the same age group extracted from “CDC WONDER- Bridged-Race Population Estimates (Vintage 2003) Request.”⁶

CAUTION concerning time trends of cause-specific death counts and rates: the Ninth Revision of the International Classification of Diseases (ICD-9) was used for death data for years prior to 1999; ICD-10 has been used for death data since 1999. Therefore, death counts and rates, by cause for 1999 and later may not be comparable to those 1998 and earlier. Some causes are affected more than others. For example, nationally, the transition from ICD-9 to ICD-10 had little effect on cancer, homicide and suicide. However, counts of Alzheimer’s disease deaths based on ICD-10 were about 50% larger than they would have been using ICD-9; pneumonia death counts were about 70% of what they would have been under ICD-9. More details regarding changes in the system for classifying causes of death can be found through “MICA Death” page on selecting and classifying causes of death (http://www.dhss.mo.gov/CDP_MICA/Changes_Sel_Class_CofD.html).

Disability Status

Disability among adults 21-64 years of age is defined as having at least one of the following: (a) blindness, deafness, or a severe vision or hearing impairment; (b) a substantial limitation in the ability to perform basic physical activities, such as walking, climbing stairs, reaching, lifting, or carrying; (c) difficulty learning, remembering, or concentrating; (d) difficulty dressing, bathing, or getting around inside the home; (e) difficulty going outside the home alone to shop or visit a doctor’s office; and (f) difficulty working at a job or business.⁷

Data Source

Percent of Missouri adults aged 21-64 years with a disability by county: U.S. Census Bureau, Census 2000 Summary Files 3 and 1, available at <http://mcdc2.missouri.edu/census2000/tablesetc.shtml> (For detail technical documentation regarding Census 2000 Summary Files, please go to http://factfinder.census.gov/servlet/DatasetMainPageServlet?_program=DEC&_lang=en)

Educational Attainment

Data Source

Educational attainment among populations 25 years and over for Missouri and the U.S.: U.S. Census Bureau. 2003 American Community Survey (ACS), Summary Table PCT034, available at http://factfinder.census.gov/servlet/DTSUBJECTServlet?_ts=146051964687.

NOTE: ACS data are limited to the household population and exclude the population living in group quarters (college dorms, military barracks, prisons and other institutions). For more information regarding ACS, please visit <http://www.census.gov/acs/www/>

Emergency Room Visits

Emergency Room (ER) visits refers to episodes of care provided to Missouri residents at hospitals that have emergency room facilities. The diagnosis categories used in the ER visits data are based on the principal diagnosis that is submitted as the first-listed diagnosis coded on the emergency room visit record. Diagnoses and procedures associated with ER visits are classified according to the Ninth Revision of the International Classification of Diseases (ICD-9). The diagnostic groupings used in the ER visits data are based on the Clinical Classification Software (CCS). For further information regarding the ER visits data, please refer to the documentation of Missouri Information for Community Assessment (MICA) Emergency Room, available at <http://www.dhss.mo.gov/EmergencyRoomMICA/Documentation.html>.

Rate of ER visits is calculated by dividing the total number of resident ER visits in a year by the midyear resident population, and expressed by number of ER visits per 1,000 resident population. For census years (1990 and 2000), rates are based on census counts of the resident population, as of April 1. For the noncensus years, rates were based on national estimates of the resident population, as of July 1.

Age-specific rate of ER visits is expressed as the annual number of resident ER visits in a given age group per 1,000 resident population in that age group.

Data Source

Missouri: ER visits were obtained through Missouri Department of Health and Senior Services (DHSS), MICA Emergency Room;⁸ age-specific rates of ER visits were derived from number of resident ER visits for given age groups (i.e., 1-9, 10-17) in a year through "MICA Emergency Room"⁸ and population estimates for the same year and the same age groups available through "MICA Population".³

Emergency Room Visits and Hospitalizations due to Injuries

The causes of the injuries are defined according to the external-cause codes (E codes) of the International Classification of Diseases-Ninth Revision-Clinical Modification (ICD-9-CM). Injury records were selected if there was a diagnosis code of 800-995 in the first diagnosis field and the injury was not a late effect according to either the principal diagnosis (905-909) code or the E-code (929,959,969,989,999). Medical misadventures (E870-E879) and adverse effects of drugs (E930-E949) were also excluded.

Rate of ER visits and hospitalizations for injuries is expressed by number of ER visits and hospitalizations in a year per 100,000 resident population in the same year.

ER visits and hospitalizations for Injuries due to motor vehicle crashes include resident records with E-codes into motor vehicle crashes on a trafficway (E-codes 810-819), and nontrafficway motor vehicle crashes, such as in a parking lot or driveway (E-codes 820-825).

ER visits and hospitalizations for Injuries due to abuse, neglect, or rape include resident records in spouse abuse, sexual abuse, physical abuse, neglect/emotional abuse, rape, shaken baby, or unspecified abuse.

For detail ICD-9-CM E-codes and diagnosis codes used to define causes of injury, and further information regarding inclusion and exclusion criteria used to build the injury data, please refer to documentation of Missouri Information for Community Assessment (MICA) Injury, available at <http://www.dhss.mo.gov/InjuryMICA/Documentation.html>

Data Source

Missouri: Missouri Department of Health and Senior Services (DHSS), MICA Injury, available at <http://www.dhss.mo.gov/InjuryMICA/>

Foodborne Diseases

Foodborne disease is caused by consuming contaminated foods or beverages. Many different disease-causing microbes, or pathogens, can contaminate foods, so there are many different foodborne infections. In addition, poisonous chemicals, or other harmful substances can cause foodborne diseases if they are present in food.⁹

Reported foodborne diseases presented in this report include botulism, campylobacteriosis, E. coli O157:H7, hepatitis A, HUS (Hemolytic Uremic Syndrome), listeriosis, salmonellosis, shigellosis, trichinosis, typhoid fever, and yersiniosis. Rate of reported cases of foodborne diseases is expressed as number of cases per 100,000 resident population. U.S. Census Bureau population estimates on July 1 of each year for 1995-1999 are used to calculate the rates for these years, and U.S. Census 2000 data is used for rates in years 2000-2004.

Data Source

Number of cases and rates of reported foodborne diseases in Missouri: Missouri Department of Health and Senior Services (DHSS), Communicable Disease Surveillance

Health Insurance Coverage

Annual Social and Economic Supplement (ASEC) of the Current Population Survey (CPS) asks about health insurance coverage in the previous calendar year. The U.S. Census Bureau broadly classifies health insurance into private and government health insurance.¹⁰

Private health insurance is coverage by a health plan provided through an employer or union (Employment-based health insurance) or purchased by an individual from a private health insurance company (Direct-purchase health insurance).

Government health insurance includes plans funded by governments at the federal, state, or local level. The major categories of government health insurance are Medicare, Medicaid, the State Children's Health Insurance Program (SCHIP), military health care, state plans, and the Indian Health Service.

- Medicare is the Federal program that helps pay health care costs for people 65 and older and for certain people under 65 with long-term disabilities.
- Medicaid is a program administered at the state level, which provides medical assistance to those meeting certain low income criteria. Families with dependent children, the elderly, blind, and disabled who are in financial need are eligible for

Medicaid. It may be known by different names in different states.

Insured. People are considered “insured” if they were covered by any type of health insurance for part or all of the previous year of the survey.

Uninsured. People are considered “uninsured” if they were not covered by any type of health insurance at any time in the previous year of the survey.

NOTE: The estimates by type of coverage are not mutually exclusive; people can be covered by more than one type of health insurance during the year.

Data Sources

Missouri and the U.S.: U.S. Census Bureau. CPS, 2004-2005 ASEC, Table HI05, available at http://pubdb3.census.gov/macro/032004/health/h05_000.htm for 2004 data and <http://pubdb3.census.gov/macro/032005/health/toc.htm> for 2005 data.

NOTE: The CPS ASEC is an annual survey of approximately 78,000 households nationwide. As with all surveys, the estimates may differ from the actual values because of sampling variation or other factors. For more information regarding health insurance data from CPS and accuracy of estimates, please visit <http://www.census.gov/hhes/www/hlthins/hlthins.html>

Missouri: State Health Access Data Assistance Center. 2004 Missouri Health Care Insurance and Access Survey (MHCIAS).

NOTE: The 2004 MHCIAS has larger sample sizes for Missouri than the CPS, and provides more detailed information about the health insurance status of subpopulations in Missouri. For more information regarding the 2004 MHCIAS, please go to http://www.dhss.mo.gov/DataAndStatisticalReports/Missouri_Final_Report.pdf.

Percent of population enrolled in Medicaid by county in Missouri: Missouri Medicaid enrollment as of August 2005, provided by Missouri Department of Social Services, Division of Medical Services; Population estimate by county as of July 1, 2004 (the most recent population estimate), obtained from U.S. Census Bureau, Population Division, available at <http://www.census.gov/popest/counties/tables/CO-EST2004-01-29.xls>. Regarding Medicaid Eligibility in Missouri, please go to <http://www.dss.mo.gov/dms/pages/puzzledterm.pdf>

Health Professional Shortage Area

The U.S. Health Resources and Services Administration, Bureau of Health Professionals (BHPR) provides criteria for determining whether an area has a shortage of primary care physicians/dentists to meet the population's needs.

Primary care Health Professional Shortage Area (HPSA). A geographic area is designated as a primary medical care HPSA if the following three criteria are met:¹¹

1. The area is a rational area for the delivery of primary medical care services.
2. One of the following conditions prevails within the area:
 - (a) The area has a population to full-time-equivalent primary care physician ratio of at least 3,500:1.
 - (b) The area has a population to full-time-equivalent primary care physician ratio of less than 3,500:1 but greater than 3,000:1 and has unusually high needs for primary care services or insufficient capacity of existing primary care providers.

3. Primary medical care professionals in contiguous areas are overutilized, excessively distant, or inaccessible to the population of the area under consideration.

Dental HPSA. A geographic area is designated as a dental HPSA if the following three criteria are met:¹²

1. The area is a rational area for the delivery of dental services.
2. One of the following conditions prevails in the area:
 - (a) The area has a population to full-time-equivalent dentist ratio of at least 5,000:1, or
 - (b) The area has a population to full-time-equivalent dentist ratio of less than 5,000:1 but greater than 4,000:1 and has unusually high needs for dental services or insufficient capacity of existing dental providers.
3. Dental professionals in contiguous areas are overutilized, excessively distant, or inaccessible to the population of the area under consideration.

For more information regarding HPSA designation, please go to <http://bhpr.hrsa.gov/shortage/>.

Data Source

Missouri: Missouri Department of Health and Senior Services (DHSS), Office of Primary Care and Rural Health

Hospitalizations

Hospitalizations refer to hospital discharges of Missouri residents from non-federal and non-state acute care (average days of care less than 30 days) general and specialty hospitals whose facilities are open to the general public. The diagnosis categories are based on the principal diagnosis, which is the “condition established after study to be chiefly responsible for occasioning the admission of the patient to the hospital for care.” Diagnoses of hospitalizations are classified using the International Classification of Diseases, Ninth Revision (ICD-9). The diagnosis groupings are based on the Clinical Classification Software (CCS). For more information regarding inclusion and exclusion criteria for the hospitalization data and the procedure and diagnostic groupings used in the hospitalization, please go to <http://www.dhss.mo.gov/InpatientHospitalizationMICA/Documentation.html#PD>.

Hospitalization rate is calculated by dividing the total number of resident hospital discharges in a year by the midyear resident population, and expressed by the number of hospitalizations per 10,000 resident population. For census years (1990 and 2000), rates are based on census counts of the resident population, as of April 1. For the non-census years, rates were based on national estimates of the resident population, as of July 1.

Age-specific hospitalization rate is expressed as the annual number of resident hospital discharges in a given age group per 10,000 resident population in that age group.

Data Source

Missouri: Hospitalizations were obtained through Missouri Department of Health and Senior Services (DHSS), Missouri Information for Community Assessment (MICA) Hospital Discharge;¹³ age-specific hospitalization rates were derived from number of resident hospitalizations for given age groups (i.e., 1-9, 10-17 years) in a year through “MICA Hospital Discharge”¹³ and population estimates for the same year and the same age groups available through “MICA Population”.³

Household Income

Household income and benefits in the past 12 months include: wage or salary income; net self-employment income; interest, dividends, or net rental or royalty income or income from estates and trusts; Social Security or railroad retirement income; Supplemental Security Income (SSI); public assistance or welfare payments; retirement, survivor, or disability pensions; and all other income.¹⁴ For information regarding sources excluded from income and benefits, please go to http://www.census.gov/acs/www/Downloads/2003/usedata/Subject_Definitions.pdf.

Data Source

U.S. Census Bureau, 2003 American Community Survey (ACS), Summary Table P069, available at http://factfinder.census.gov/servlet/DTSUBJECTKEYWORDServlet?_ts=146054116859

NOTE: ACS data are limited to the household population and exclude the population living in group quarters (college dorms, military barracks, prisons and other institutions). For more information regarding ACS, please visit <http://www.census.gov/acs/www/>

Infant Mortality Rate

Infant mortality rate is calculated by dividing the number of infant deaths during a calendar year by the number of live births in the same year. It is expressed as the number of infant deaths per 1,000 live births.

For race specific infant mortality rate, the race of an infant who died was based on the death certificate; the race of a live birth was based on the birth certificate.

Data Sources

Missouri data: The Missouri Department of Health and Senior Services (DHSS), Missouri Vital Statistics Report, 1994-2003, Table 24.

U.S. data (1994-2002): Centers for Disease Control and Prevention (CDC). Deaths: final data for 2002, Table 30.⁴

U.S. data (preliminary data 2003): CDC. Deaths: preliminary data for 2003, Table 4.¹⁵

Leading Causes of Death

Causes of death classified by the International Classification of Diseases, Tenth Revision (ICD-10) are ranked according to the number of deaths assigned to rankable causes. The grouping of causes of death is based on specifications from the National Center for Health Statistics (NCHS). Briefly, two tabulation lists are used. A list of 113 selected causes of death is used to select 50 rankable causes for deaths of all ages; and a list of 130 selected causes of infant death is used to select 71 rankable causes for infant deaths. More details regarding ranking procedures and ICD codes to define causes of death can be found in "Deaths: Leading causes for 2002".¹⁶

Data Sources

Missouri data: Missouri Department of Health and Senior Services (DHSS), Missouri Vital Statistics Report 2002-2003, Table 24, available at: <http://www.dhss.mo.gov/VitalStatistics/>

U.S. data: Centers for Disease Control and Prevention (CDC), NCHS. CDC WONDER- Leading causes of death.⁵

Life Expectancy

The average number of years a group of persons would be expected to live from the day they were born (for life expectancy at birth) or at age 65 (for life expectancy at age 65), based on mortality statistics at the time. The life table method was used to calculate the life expectancies.

Data Sources

Missouri data: Missouri Department of Health and Senior Services (DHSS), Missouri Vital Statistics Report, 1994-2003, Table 29.

U.S. data (1994-2002): Centers for Disease Control and Prevention (CDC). Deaths: final data for 2002, Table 8.⁴

U.S. data (preliminary data 2003): CDC. Deaths: preliminary data for 2003, Table 6.¹⁵

Low Birth Weight and Very Low Birth Weight

Low birth weight (LBW) infants are those live births with birth weight less than 2500 grams, or about 5 ½ lbs. Very low birth weight (VLBW) infants weigh less than 1500 grams, or about 3.3 lbs. Rate of LBW/VLBW is calculated by dividing the number of infants of LBW/VLBW during a calendar year by the number of live births reported in the same year.

Data Sources

Missouri: Missouri Department of Health and Senior Services (DHSS), Missouri Vital Statistics 1994-2003, Table 8

U.S.: Centers for Disease Control and Prevention (CDC), National Center for Health Statistics (NCHS). Births: final data for 2003.¹⁷ Available at: http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=16176060

Low Consumption of Fruits and Vegetables

All survey respondents 18 years and older who report they are consuming less than five servings of fruits and vegetables a day.

Data Source

Missouri and U.S.: Behavior Risk Factor Surveillance System (BRFSS)

NOTE: The BRFSS is an ongoing system of telephone surveys. BRFSS is population-based data representative of adult population 18 years of age or older living in households in the U.S. The BRFSS data are self-reported. For more information on BRFSS, please visit: http://www.cdc.gov/brfss/technical_infodata/surveydata.htm

Medicaid Expenditures for Seniors

Data Source: Medicaid Statistical Information System. Medicaid Statistical Information System Summary Reports, Federal fiscal year 2004. Medicaid beneficiaries/payments by service category, and by age, by sex, and by race/ethnicity. 2005.

Medical Facilities in Missouri

Federally Qualified Health Centers (FQHCs) are nonprofit, consumer-directed corporations that provide high quality care and cost-effective treatment to the underserved and the uninsured. FQHCs include community health centers, tribal health clinics, migrant health services, and health centers for the homeless.¹⁸

Critical Access Hospitals are a class of Medicare providers introduced by Federal policymakers, providing limited outpatient and inpatient hospital services to people in rural areas.¹⁸

Data Source

Missouri: Missouri Department of Health and Senior Services (DHSS)

Medicare Estimated Benefit Payment

Medicare benefit payments represent actual Department of Treasury (DOT) disbursements on a paid basis by location of provider or plan, not residence of beneficiary. Distribution of benefit payments by state is based on a method which considered actual payments to health maintenance organizations and estimated payments for other providers of Medicare Services.¹⁹

Data Source

Missouri: Centers for Medicare & Medicaid Services. Medicare estimated benefit payments by State, Fiscal Year 2001¹⁹

Mental Disorders

Hospitalizations for mental disorders include resident hospitalizations with principal diagnoses in mental retardation, alcohol and substance-related mental disorders, senility and organic mental disorders, affective disorders, schizophrenia and related disorders, other psychoses, anxiety - somatoform - dissociative - and personality disorders, adjustment - undersocialized and other preadult disorders, other mental conditions, or personal history of mental disorder - mental and behavioral problems- observation and screening for mental condition. The subcategory of alcohol and substance-related mental disorders include alcoholic psychoses, drug psychoses, alcohol dependence syndrome, drug dependence, alcohol abuse, drug abuse, and tobacco use disorder, and history of tobacco use. Diagnoses of hospitalizations are classified using the International Classification of Diseases, Ninth Revision (ICD-9). The diagnosis groupings are based on the Clinical Classification Software (CCS). For more information regarding CCS and listing of ICD-9 codes included in each CCS diagnosis category, please visit <http://www.hcup-us.ahrq.gov/toolssoftware/ccs/ccs.jsp>.

Data Source

Missouri: Missouri Department of Health and Senior Services (DHSS), Missouri Information for Community Assessment (MICA) Hospital Discharge, available at: http://www.dhss.mo.gov/D_C_DofCMICA/

Alcohol- and drug-induced deaths include resident deaths for which underlying cause of death given on the death certificate was related to alcohol or drug abuse. For all drugs including alcohol, deaths were included if attributed to dependence, nondependent use, accidental poisoning, or suicide. In addition, alcoholic polyneuropathy, cardiomyopathy, and gastritis are included, as are chronic liver disease and cirrhosis when specified as due to alcohol. Not all deaths due to alcohol/substance abuse are included in this death count. For more information regarding selection criteria to define this indicator, please go to http://www.dhss.mo.gov/CDP_MICA/CofDDefinitionofIndicators.html#119.

NOTE: the Ninth Revision of the International Classification of Diseases (ICD-9) was used for death data for year 1998 and earlier; ICD-10 has been used for death data since 1999. Therefore, death counts and rates, by cause for 1999 and later may not be comparable to those 1998 and earlier.

Data Source

Missouri: Missouri Department of Health and Senior Services (DHSS), Health Statistics

Minority Population

Minority population presented in this report include all non-white population.

Data Source

Missouri: National Center for Health Statistics (NCHS)

Missouri Emergency Medical Services

Missouri Emergency Medical Services (EMS) include helicopter services licensed to transport patients, emergency medical response agency, and ground services (i.e. fire, Emergency Medical Technician or ambulance services that fire districts provide).

Data Source

Missouri: Missouri Department of Health and Senior Services (DHSS), Geographical Information Systems (GIS) Network Data

Moderate or Vigorous Physical Activity

Moderate physical activities include activities such as brisk walking, bicycling, vacuuming, gardening, or anything else that causes small increases in breathing or heart rate.

Vigorous physical activities include activities such as running, aerobics, heavy yard work, or anything else that causes large increases in breathing or heart rate?

Recommended moderate physical activity is defined as at least 30 minutes of moderate physical activity per day, 5 or more days per week.

Recommended vigorous physical activity is defined as at least 20 minutes of vigorous physical activity per day, 3 or more days per week.

Data Source

Missouri and U.S.: Behavior Risk Factor Surveillance System (BRFSS)

NOTE: The BRFSS is an ongoing system of telephone surveys. BRFSS is population-based data representative of adult population 18 years of age or older living in households in the U.S. The BRFSS data are self-reported. For more information on BRFSS, please visit: http://www.cdc.gov/brfss/technical_infodata/surveydata.htm

Overweight and Obesity

Body Mass Index (BMI)

BMI is a common measure expressing the relationship (or ratio) of weight-to-height. It is a mathematical formula in which a person's body weight in kilograms is divided by the square of his or her height in meters.

Overweight and obesity in adults (age 20+ years)

Recommended by the National Heart, Lung, and Blood Institute and World Health Organization, overweight is defined as a BMI of greater or equal to 25 kg/m² and less than 30 kg/m², and obesity is defined as a BMI of 30 kg/m² or higher.

Overweight in children and adolescents (age 2 – 20 years)

Overweight among children and adolescents is based on the Centers for Disease Control and Prevention (CDC) 2000 growth charts for the U.S. Overweight is defined as at or above the 95th percentile of BMI for age.

Overweight for infants and Children (less than 2 Years of age)

Overweight for children under two years of age is based on the 2000 CDC growth chart percentiles for weight-for-length. Overweight in this age group is defined as at or above 95th percentile of weight for length.

Data Sources

Adults and seniors (18 years of age and older): Behavior Risk Factor Surveillance System (BRFSS) (self-reported weight and height).

NOTE: The BRFSS is an ongoing system of telephone surveys. BRFSS is population-based data representative of adult population 18 years of age or older living in households in the U.S. The BRFSS data are self-reported. For more information on BRFSS, visit: http://www.cdc.gov/brfss/technical_infodata/surveydata.htm

High school students (grades 9-12) in Missouri and the U.S.: Youth Risk Behavior Surveillance System (YRBSS) (self-reported weight and height).

NOTE: The Youth Risk Behavior Survey (YRBS) conducted every two years, is population-based data, and includes national, state, and local school-based surveys of representative samples of 9th through 12th grade students. Students in the national sample (50 states and the District of Columbia) completed a self-administered questionnaire. Self-reported information is collected. For more information on YRBSS, visit: www.cdc.gov/nccdphp/dash/yrbs

Middle school students (grades 6-8) in Missouri: Missouri Youth Tobacco Survey (YTS) (self-reported weight and height).

NOTE: YTS is population-based data representative of Missouri school children in grades 6-12. Self-reported information is collected. For more information on YTS, please go to <http://www.health.state.mo.us/YTS/index.html>

Elementary school students (grade 5 aged 9-11 yrs) in Missouri: Missouri School-aged Children Health Service Program (MSCHSP) (measured weight and height).

NOTE: MSCHSP data is program-based and not representative of primary school children in Missouri. MSCHSP collected measured weight and height information in elementary school students in grade 5 (age 9-11) who participated in the program. MSCHSP provided measured weight and height information.

Infants and children (age less than 5 years) in Missouri: Missouri Pediatric Nutrition Surveillance System (PNSS) (measured weight and height).

NOTE: Missouri PNSS data include records of low-income infants and children less than 5 years of age that participate in the Special Supplemental Nutrition Program for Women, Infants and Children (WIC) program. WIC data is program-based and not representative of Missouri infants and children aged less than 5 years. Weight and height in WIC are measured weight and height. For more information on PNSS, please go to <http://www.dhss.mo.gov/PedNSS/>

Children and adolescents in the U.S.: National Health and Nutrition Examination Surveys (NHANES) ²⁰ (measured weight and height).

NOTE: NHANES are a series of cross-sectional, nationally representative examination surveys conducted by CDC's National Center for Health Statistics. The surveys use highly standardized data-collection procedures and probability samples to gather information regarding the health and nutritional status of the civilian, noninstitutionalized U.S. population.

Poverty

Poverty is determined by comparing the family's gross income with the poverty threshold,²¹ which adjusts for family size and composition. If a family's total income is less than that family's threshold, then every individual in that family is considered to be in poverty. The official poverty thresholds do not vary geographically, but they are updated annually for inflation using the Consumer Price Index (CPI-U). The official poverty definition uses money income before taxes and does not include capital gains or noncash benefits (such as public housing, Medicaid, and food stamps).²²

Annual poverty rate is the percent of people who were in poverty in a calendar year. People whose poverty status cannot be determined such as unrelated individuals under 15 are excluded from the "poverty universe", and excluded from both the numerator and the denominator when calculating poverty rates.²²

Data Sources

Poverty rate for the U.S. and the statewide Missouri 2003: U.S. Census Bureau. Current Population Survey (CPS), 2004 Annual Social and Economic Supplement (ASEC), POV46- Poverty status by state.²³

NOTE: The CPS ASEC is an annual survey of approximately 78,000 households nationwide. As with all surveys, the estimates may differ from the actual values because of sampling variation or other factors. For further information about the source and accuracy of the estimates, please go to www.census.gov/hhes/www/p60-226sa.pdf.

Poverty rate by county in Missouri: U.S. Census Bureau, Housing and Household Economic Statistics Division, Small Area Estimates Branch, Small Area Income and Poverty Estimates (SAIPE) program, available at <http://www.census.gov/hhes/www/saiepe/county.html>

NOTE: The SAIPE, a part of the American Community Survey program, creates statistical models to produce more reliable subnational estimates of income and poverty by combining survey results from the ASEC of the CPS with administrative records such as aggregate food stamps and aggregate adjusted gross income from tax returns. For further information about SAIPE and accuracy of the estimates, please go to <http://www.census.gov/hhes/www/saiepe/overview.html>

Prenatal Care

Early prenatal care is expressed as the percent of resident live births in a calendar year whose mothers started prenatal care in the first trimester of pregnancy

Late or no prenatal care is expressed as the percent of resident live births in a calendar year whose mothers began receiving prenatal care in the third trimester of pregnancy or received no prenatal care at all.

Data Sources

Missouri: Missouri Department of Health and Senior Services (DHSS), Missouri Information for Community Assessment (MICA) Births, available at <http://www.dhss.mo.gov/BirthMICA/index.html>.

U.S.: Centers for Disease Control and Prevention (CDC), National Center for Health Statistics (NCHS). Births: final data for 2003.¹⁷ Available at: http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=16176060

Prevalence

Prevalence (Prevalence rate) is defined as the proportion of a population that has disease/condition at a specific point in time or for a specified period of time, and expressed by percentage. Median Prevalence defines the 50th percentile of the middle value when the estimates for all states are ordered from smallest to largest.

NOTE: The estimates from population surveys are subject to sampling error, the effect of surveying a sample rather than taking a complete population enumeration.

Reportable Diseases

Missouri's reportable disease list is based on the Nationally Notifiable Disease List (NNDL) created by the Council of State and Territorial Epidemiologists (CSTE) and the Centers for Disease Control and Prevention (CDC) and updated annually. These diseases have very specific case definitions and are reported to Missouri Department of Health and Senior Services (DHSS) by various entities based on these cases definitions. Not all infectious diseases are reportable by law. For example, many of the leading infectious causes of hospitalization (e.g., skin infections, pneumonia) are not reportable, since they do not require direct public health intervention. Diseases and conditions reportable in Missouri can be found under <http://www.health.state.mo.us/CommunicableDisease/reportablediseaselist2.pdf>. For details regarding case definitions for infectious conditions under public health surveillance, please go to <ftp://ftp.cdc.gov/pub/Publications/mmwr/rr/rr4610.pdf>.

Data Source: DHSS, Communicable Disease Surveillance

Self-reported Arthritis

All survey respondents 18 years and older who answered the following questions affirmatively were considered as having arthritis: 'Have you ever been told by a doctor that you have arthritis?' (1996); 'Have you ever been told by a doctor, nurse, or other health professional that you have arthritis?' (1999, 2001, 2004); 'Have you ever been told by a doctor or other health professional that you have some form of arthritis, rheumatoid arthritis, gout, lupus, or fibromyalgia?' (2003)

Data Source

Missouri and U.S.: Behavioral Risk Factor Surveillance System (BRFSS).

NOTE: The BRFSS is an ongoing system of telephone surveys. BRFSS is population-based data representative of adult population 18 years of age or older living in households in the U.S. The BRFSS data are self-reported. For more information regarding BRFSS, please visit <http://www.cdc.gov/brfss/index.htm>

Self-reported Diabetes

All survey Respondents 18 years and older who answered the following question affirmatively were considered as having diabetes: 'Have you ever been told by a doctor that you have diabetes?' (Excluding gestational diabetes).

Data Source

Missouri and U.S.: Behavioral Risk Factor Surveillance System (BRFSS).

NOTE: The BRFSS is an ongoing system of telephone surveys. BRFSS is population-based data representative of adult population 18 years of age or older living in households in the U.S. The BRFSS data are self-reported. For more information regarding BRFSS, please visit <http://www.cdc.gov/brfss/index.htm>

Teen Birth Rate

Birth rate for women 15-17 years of age is calculated by dividing number of resident live births to teen mothers aged 15-17 years in an area in a year by the midyear female resident population aged 15-17 years.

Data Sources

Missouri: live births obtained from Missouri Department of Health and Senior Services (DHSS), Missouri Information for Community Assessment (MICA) Birth (<http://www.dhss.mo.gov/BirthMICA/index.html>); population estimates obtained from Population MICA (<http://www.dhss.mo.gov/PopulationMICA/>)

U.S.: Centers for Disease Control and Prevention (CDC), National Center for Health Statistics (NCHS), Births: Final Data for 2003, available at http://www.cdc.gov/nchs/data/nvsr/nvsr54/nvsr54_02.pdf

Tobacco Use

Current cigarette smokers for adults and seniors 18 years and older include all respondents who have ever smoked 100 cigarettes in their lifetime and reported smoking every day or some days.

Current cigarette smokers for school children and adolescents in grades 6-12 include all respondents who reported having smoked cigarettes on one or more of the 30 days prior to the survey. Any form of tobacco use includes cigarettes, cigars, bidis, kreteks, pipes, and smokeless tobacco.

Data Sources

Adults and seniors 18 years and older in Missouri and the U.S.: Behavioral Risk Factor Surveillance System (BRFSS).

NOTE: The BRFSS is an ongoing system of telephone surveys. BRFSS is population-based data representative of adult population 18 years of age or older living in households in the U.S. The BRFSS data are self-reported. For more information regarding BRFSS, please visit <http://www.cdc.gov/brfss/index.htm>

Missouri school students in grades 6-12: Missouri Youth Tobacco Survey (YTS).

NOTE: YTS is population-based data representative of Missouri school children in grades 6-12. Self-reported information is collected. For more information on YTS, please go to <http://www.health.state.mo.us/YTS/index.html>

School students in grades 9-12 in Missouri and the U.S.: Youth Risk Behavior Surveillance System (YRBSS).

NOTE: The Youth Risk Behavior Survey (YRBS) conducted every two years, is population-based data, and includes national, state, and local school-based surveys of representative samples of 9th through 12th grade students. Students in the national sample (50 states and the District of Columbia) completed a self-administered questionnaire. Self-reported information is collected. For more information on YRBSS, visit: www.cdc.gov/nccdphp/dash/yrbs

Vaccine Preventable Diseases

Death/hospitalization due to Vaccine Preventable Diseases (VPDs). VPDs refer to underlying cause of death (for death data)/ principal diagnosis (for hospitalization data) as a disease which could have been prevented by a vaccination listed on the immunization schedules recommended by the Advisory Committee on Immunization Practices of the Centers for Disease Control and Prevention (CDC) (<http://www.cdc.gov/nip/publications/acip-list.htm>). Those diseases include measles-mumps-rubella (MMR), diphtheria-tetanus-pertussis (DPT), hepatitis A and B, influenza, pneumococcus, polio, varicella (chickenpox), and for age under 5, Haemophilus influenzae type b (Hib). For death data, the Ninth Revision of the International Classification of Diseases (ICD-9) was used for years 1998 and earlier and ICD-10 has been used since 1999. Diagnoses associated with hospitalizations are classified in accordance with ICD-9. For specific ICD codes to define those VPDs, please go to <http://www.dhss.mo.gov/PriorityMICA/definition.html#3033>.

Reported cases of VPDs. Reported cases of VPDs among children 0-9 presented in this report include above VPDs, not counting influenza, varicella (chickenpox), and haemophilus influenzae type b (Hib). (Influenza is reported seasonally; varicella data is only available for all ages in aggregated form; and Hib is not reported individually.) In this report, reported cases of laboratory-confirmed influenza are presented separately among children aged 0-14 years in Missouri during an influenza season, which begins in Week 40 (around the first week of October) of one calendar year and ends in Week 20 (near middle or late May) of the next calendar year.

Data Source

Hospitalizations and deaths due to VPDs in Missouri: Missouri Department of Health and Senior Services (DHSS), Health Statistics.

Reported cases of VPDs in Missouri: DHSS, Communicable Disease Surveillance

Years of Potential Life Lost Before Age 75 Years

Years of potential life lost (YPLL) represents the number of years of potential life lost by each death before a predetermined end point (e.g., 65 or 75 years of age). The YPLL measure provides a picture of premature mortality by weighting deaths that occur

at younger ages more heavily than those occurring at older ages. YPLL before age 75 years is calculated by subtracting the age at death from the standard age 75 years, and then summing the individual YPLL. Note: calculation for YPLL before age 75 does not include people who died at 75 or older.

YPLL rate before age 75 is calculated by dividing the sum of the YPLL in a year by the total resident population estimate in the same year less than 75 years of age, and expressed by number of YPLL per 100,000 population.

Age-adjusted YPLL rate is used to compare YPLL measure among different populations and over time. The age adjustment used the U.S. 2000 standard population. This rate is calculated by direct method and derived by multiplying the age-specific death rates by the standard population for the same age group, and the difference between age 75 years and the midpoint of each age group less than 75 years to obtain weighted age-specific YPLL. The weighted age-specific YPLL was then summed up across all age groups under 75, and divided by the standard population less than 75.

Data Sources

Missouri and U.S. data for overall population: Centers for Disease Control and Prevention (CDC). WISQARS (Web-based Injury Statistics Query and Reporting System) years of potential life lost (YPLL) reports, 1999 - 2002²⁴

Missouri residents at ages 10-17 and 18-64: Missouri Department of Health and Senior Services (DHSS), Health Statistics, Death Data

References

Key Population Health Indicators

1. Missouri Department of Health and Senior Services (DHSS). Missouri Vital Statistics 2003, Table 24. Available at: <http://www.dhss.mo.gov/VitalStatistics/MVS03/Table24.pdf>. Accessed: July, 2005.
2. Data provided by Missouri Department of Health and Senior Services (DHSS), Health Statistics.
3. Missouri Department of Health and Senior Services (DHSS). MICA (Missouri Information for Community Assessment) Death. Available at: <http://www.dhss.mo.gov/DeathMICA/index.html>. Accessed: August, 2005.
4. Kochanek KD, Murphy SL, Anderson RN, Scott C. Deaths: final data for 2002. Natl Vital Stat Rep.2004;53:1-115. Available at: http://www.cdc.gov/nchs/data/nvsr/nvsr53/nvsr53_05.pdf.
5. U.S. Census Bureau. Current Population Survey 2004 Annual Social and Economic Supplement, Poverty Thresholds 2003. May 13, 2005. Available at: <http://www.census.gov/hhes/www/poverty/threshld/thresh03.html>. Accessed: July, 2005.
6. U.S. Census Bureau. Current Population Survey, 2004 Annual Social and Economic Supplement, POV46- Poverty status by state. Nov 22, 2004. Available at: <http://pubdb3.census.gov/macro/032004/pov/toc.htm>. Accessed: July, 2005.
7. U.S. Census Bureau. Current Population Survey (CPS) Table Creator for the Annual Social and Economic Supplement. Aug 30, 2005. Available at: http://www.census.gov/hhes/www/cpstc/cps_table_creator.html. Accessed: July, 2005.
8. Centers for Disease Control and Prevention (CDC), National Center for Chronic Disease Prevention and Health Promotion. Behavioral Risk Factor Surveillance System Online Prevalence Data, 1995-2004. Available at: <http://apps.nccd.cdc.gov/brfss/>. Accessed: August, 2004.
9. U.S. Department of Health and Human Services. The health consequences of smoking - Executive summary: A report of the Surgeon General May 27, 2004. Available at: http://www.cdc.gov/tobacco/sgr/sgr_2004/pdf/executivesummary.pdf.
10. Weissman JS, Gatsonis C, Epstein AM. Rates of avoidable hospitalization by insurance status in Massachusetts and Maryland. Jama.1992;268:2388-2394. Available at: http://www.ncbi.nlm.nih.gov/entrez/curry.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=1404795.
11. Centers for Disease Control and Prevention (CDC), National Center for Health Statistics. New report studies-Emergency departments serving high volumes of "Safety-Net" patients. Available at: <http://www.cdc.gov/nchs/pressroom/04facts/safetynet.htm>.
12. U.S. Census Bureau. Current Population Survey, 2005 Annual Social and Economic Supplement, Table HI05. Jul 19, 2005. Available at: http://pubdb3.census.gov/macro/032005/health/h05_000.htm. Accessed: September, 2005.

Missouri's Population

1. Missouri Department of Health and Senior Services (DHSS). MICA (Missouri Information for Community Assessment) Population. Available at: <http://www.dhss.mo.gov/PopulationMICA/>. Accessed: August, 2005.
2. Centers for Disease Control and Prevention (CDC). CDC WONDER. Bridged-Race Population Estimates (Vintage 2003) Request. Available at: <http://wonder.cdc.gov/Bridged-Race-v2003.HTML>. Accessed: August, 2005.

3. U.S. Census Bureau. American Community Survey, 2003 subject definitions. Available at: http://www.census.gov/acs/www/Downloads/2003/usedata/Subject_Definitions.pdf.
4. U.S. Census Bureau. 2003 American Community Survey. Data tables. Available at: <http://www.census.gov/acs/www/Products/Profiles/Single/2003/ACS/US.htm>. Accessed: July, 2005.
5. Missouri Census Data Center. Historical population data. April 21, 2005. Available at: <http://mcdc2.missouri.edu/trends/historical.shtml>. Accessed: September, 2005.
6. Cavannaugh JC. Adult development and aging. Boston, MA: Brooks Cole Publishing; 1997

Infants and Children (Age 0-9 Years)

1. Missouri Department of Health and Senior Services (DHSS). MICA (Missouri Information for Community Assessment) Population. Available at: <http://www.dhss.mo.gov/PopulationMICA/>. Accessed: August, 2005.
2. U.S. Census Bureau. Current Population Survey, 2004 Annual Social and Economic Supplement, Table HI05. Available at: http://pubdb3.census.gov/macro/032004/health/h05_000.htm. Accessed: August, 2005.
3. U.S. Census Bureau. 2003 American Community Survey. Summary Table P026. Available at: http://factfinder.census.gov/servlet/DTSUBJECTKEYWORDSERVLET?_ts=145876298421. Accessed: August, 2005.
4. Data provided by Missouri Department of Health and Senior Services (DHSS), Health Statistics.
5. Missouri Department of Health and Senior Services (DHSS). Missouri Vital Statistics 2003, Table 24. Available at: <http://www.dhss.mo.gov/VitalStatistics/MVS03/Table24.pdf>. Accessed: July, 2005.
6. Centers for Disease Control and Prevention (CDC). CDC WONDER- Leading causes of death. Available at: <http://webapp.cdc.gov/sasweb/ncipc/leadcaus10.html>. Accessed: August, 2005.
7. Centers for Disease Control and Prevention (CDC). CDC WONDER. Bridged-Race Population Estimates (Vintage 2003) Request. Available at: <http://wonder.cdc.gov/Bridged-Race-v2003.HTML>. Accessed: August, 2005.
8. Missouri Department of Health and Senior Services (DHSS). Missouri Vital Statistics 2003, Table 8. Available at: <http://www.dhss.mo.gov/VitalStatistics/MVS03/Table8.pdf>. Accessed: September, 2005.
9. Martin JA, Hamilton BE, Sutton PD, Ventura SJ, Menacker F, Munson ML. Births: final data for 2003. Natl Vital Stat Rep.2005;54:1-116. Available at: http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=16176060.
10. Centers for Disease Control and Prevention (CDC). Infant mortality and low birth weight among black and white infants--United States, 1980-2000. MMWR Morb Mortal Wkly Rep.2002;51:589-592. Available at: http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=12139201.
11. U.S. Department of Health and Human Services, Health Resources and Services Administration. Women's health USA 2005. Rockville, Maryland: U.S. Department of Health and Human Services, 2005. Available at: http://mchb.hrsa.gov/whusa_05/pages/0424pc.htm.
12. Missouri Department of Health and Senior Services (DHSS). MICA (Missouri Information for Community Assessment) Births. Available at: <http://www.dhss.mo.gov/BirthMICA/index.html>. Accessed: August, 2005.

13. Centers for Disease Control and Prevention (CDC), National Center for Injury Prevention and Control. Child passenger safety. Available at: <http://www.cdc.gov/ncipc/duip//spotlite/chldseat.htm>. Accessed: September, 2005.
14. Centers for Disease Control and Prevention (CDC), National Immunization Program. National Immunization Survey (NIS), Tables. Available at: <http://www.cdc.gov/nip/coverage/chart>. Accessed: August, 2005.
15. Data provided by Missouri Department of Health and Senior Services (DHSS), Communicable Disease Surveillance.
16. Centers for Disease Control and Prevention (CDC), National Center for Injury Prevention and Control. Child maltreatment: Fact sheet. Available at: <http://www.cdc.gov/ncipc/factsheets/cmfacts.htm>. Accessed: September, 2005.
17. Missouri Department of Social Services, Children's Division. Child abuse and neglect calendar year 2004 annual report: Missouri Department of Social Services, 2005. Available at: <http://www.dss.mo.gov/re/canar.htm>.
18. Missouri Department of Health and Senior Services (DHSS). MICA (Missouri Information for Community Assessment) Injury. Available at: <http://www.dhss.mo.gov/InjuryMICA/>. Accessed: August, 2005.
19. Department of Health and Human Services, Administration on Children Youth and Families. Emerging practices in the prevention of child abuse and neglect. Washington, DC: Government Printing Office; 2003
20. Bailey JE, Kellermann AL, Somes GW, Banton JG, Rivara FP, Rushforth NP. Risk factors for violent death of women in the home. *Arch Intern Med*.1997;157:777-782. Available at: http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=9125010.
21. Centers for Disease Control and Prevention (CDC), National Center for Environmental Health. Asthma's impact on children and adolescents. Available at: http://www.cdc.gov/asthma/children.htm#asthma_control. Accessed: September, 2005.
22. Data provided by Missouri Department of Health and Senior Services (DHSS), 2004 Missouri Behavioral Risk Factor Surveillance Survey (BRFSS).
23. Centers for Disease Control and Prevention (CDC), National Center for Environmental Health. Asthma interventions. Available at: <http://www.cdc.gov/asthma/interventions.htm>. Accessed: September, 2005.
24. Missouri Department of Health and Senior Services (DHSS). Childhood lead poisoning prevention. Available at: <http://www.dhss.mo.gov/ChildhoodLead/>. Accessed: 2005, September.
25. Meyer PA, Pivetz T, Dignam TA, Homa DM, Schoonover J, Brody D. Surveillance for elevated blood lead levels among children--United States, 1997-2001. *MMWR Surveill Summ*.2003;52:1-21. Available at: http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=14532866.
26. Missouri Department of Health and Senior Services (DHSS), Childhood Lead Poisoning Prevention Program (CLPPP). Missouri childhood lead poisoning prevention - Annual report Fiscal Year 2004. Available at: <http://www.dhss.mo.gov/ChildhoodLead/AnnualReportFY2004.pdf>. Accessed: September, 2005.
27. Data provided by Missouri Department of Health and Senior Services (DHSS), Division of Community and Public Health, Section of Healthy Families and Youth, Genetics and Healthy Childhood Unit.
28. U.S. Surgeon General. Overweight and obesity: Health consequences. Available at: http://www.surgeongeneral.gov/topics/obesity/calltoaction/fact_consequences.htm. Accessed: August, 2005.

29. Freedman DS, Dietz WH, Srinivasan SR, Berenson GS. The relation of overweight to cardiovascular risk factors among children and adolescents: the Bogalusa Heart Study. *Pediatrics*.1999;103:1175-1182. Available at: http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=10353925.
30. Data provided by Missouri Department of Health and Senior Services, Pediatric Nutrition Surveillance, Missouri.
31. Hedley AA, Ogden CL, Johnson CL, Carroll MD, Curtin LR, Flegal KM. Prevalence of overweight and obesity among US children, adolescents, and adults, 1999-2002. *Jama*.2004;291:2847-2850. Available at: http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=15199035.

Adolescents (Age 10-17 Years)

1. Missouri Department of Health and Senior Services (DHSS). MICA (Missouri Information for Community Assessment) Population. Available at: <http://www.dhss.mo.gov/PopulationMICA/>. Accessed: August, 2005.
2. Data provided by Missouri Department of Health and Senior Services (DHSS), Health Statistics.
3. Centers for Disease Control and Prevention (CDC). Perspectives in disease prevention and health promotion state action to prevent motor vehicle deaths and injuries among children and adolescents. *MMWR*.1982;31:488-490. Available at: <http://www.cdc.gov/mmwr/preview/mmwrhtml/00001156.htm>.
4. Missouri Department of Health and Senior Services (DHSS). MICA (Missouri Information for Community Assessment) Injury. Available at: <http://www.dhss.mo.gov/InjuryMICA/>. Accessed: August, 2005.
5. U.S. Department of Health and Human Services. The Surgeon General's call to action to prevent and decrease overweight and obesity. U.S. Department of Health and Human Services, Public Health Service, Office of the Surgeon General. Available at: <http://www.surgeongeneral.gov/topics/obesity/calltoaction/toc.htm>. Accessed: September, 2005.
6. Missouri Department of Health and Senior Services (DHSS). Preventing obesity and other chronic diseases. Missouri's nutrition and physical activity plan 2005. Available at: <http://www.dhss.mo.gov/Obesity/ObesityBurdenWebversion.pdf>. Accessed: September, 2005.
7. Missouri Department of Health and Senior Services (DHSS). Smoking-attributable mortality in Missouri, 2003 (Unpublished data) July, 2005.
8. Centers for Disease Control and Prevention (CDC). Smoking-attributable mortality, morbidity and economic costs (SAMMEC). Available at: <http://apps.nccd.cdc.gov/sammec/>. Accessed: September, 2005.
9. Centers for Disease Control and Prevention (CDC). Tobacco control state highlights 2002: Impact and opportunity. Atlanta, GA: Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2002.
10. Missouri Department of Health and Senior Services (DHSS). Missouri comprehensive tobacco use prevention program strategic plan 2003-2009 December, 2003. Available at: <http://www.dhss.mo.gov/SmokingAndTobacco/StrategicPlan.pdf>.

11. Centers for Disease Control and Prevention (CDC). Youth Risk Behavior Surveillance System (YRBSS). Available at: <http://apps.nccd.cdc.gov/yrbss/SelectLocyear.asp?cat=3&Quest=Q50>. Accessed: September, 2005.
12. U.S. Department of Health and Human Services. Caring for Every Child's Mental Health Campaign. U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration. Available at: <http://www.mentalhealth.samhsa.gov/child/default.asp>. Accessed: September, 2005.
13. U.S. Department of Health and Human Services. Child, Adolescent & Family. U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration. Available at: <http://www.mentalhealth.samhsa.gov/cmhs/ChildrensCampaign/>. Accessed: September, 2005.
14. Campaign for Tobacco-Free Kids. Campaign for Tobacco-Free Kids. Available at: <http://tobaccofreekids.org/>. Accessed: September, 2005.
15. Centers for Disease Control and Prevention (CDC), National Center for Environmental Health. Asthma. Available at: http://www.cdc.gov/asthma/asthma_control. Accessed: September, 2005.
16. Data provided by Missouri Department of Health and Senior Services (DHSS), 2004 Missouri Behavioral Risk Factor Surveillance Survey (BRFSS).
17. Centers for Disease Control and Prevention (CDC), National Center for Environmental Health. Asthma interventions. Available at: <http://www.cdc.gov/asthma/interventions.htm>. Accessed: September, 2005.
18. Centers for Disease Control and Prevention (CDC), National Center for Chronic Disease Prevention and Health Promotion. Healthy Youth- Asthma. Available at: <http://www.cdc.gov/HealthyYouth/asthma/index.htm>. Accessed: September, 2005.
19. Centers for Disease Control and Prevention (CDC). Unintended and teen pregnancy prevention: Teen pregnancy. Available at: <http://www.cdc.gov/reproductivehealth/UnintendedPregnancy/Teen.htm>. Accessed: September, 2005.
20. Fraser AM, Brockert JE, Ward RH. Association of young maternal age with adverse reproductive outcomes. *N Engl J Med*. 1995;332:1113-1117. Available at: http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=7700283.
21. Missouri Department of Health and Senior Services (DHSS). DHSS strategic plan 2000-2005, 2005 update, 2005.

Adults (Age 18-64 Years)

1. U.S. Census Bureau. Current Population Survey, 2004 Annual Social and Economic Supplement, Table HI05. Available at: http://pubdb3.census.gov/macro/032004/health/h05_000.htm. Accessed: August, 2005.
2. State Health Access Data Assistance Center. 2004 Missouri Health Care Insurance and Access Survey: select results, 2005. Available at: http://www.dhss.mo.gov/DataAndStatisticalReports/Missouri_Final_Report.pdf.
3. Data provided by Missouri Department of Health and Senior Services (DHSS), Health Statistics.

4. Centers for Disease Control and Prevention (CDC). CDC WONDER- Leading causes of death. Available at: <http://webapp.cdc.gov/sasweb/ncipc/leadcaus10.html>. Accessed: August, 2005.
5. Centers for Disease Control and Prevention (CDC). CDC WONDER. Bridged-Race Population Estimates (Vintage 2003) Request. Available at: <http://wonder.cdc.gov/Bridged-Race-v2003.HTML>. Accessed: August, 2005.
6. U.S. Department of Health and Human Services. The health consequences of smoking - Executive summary: A report of the Surgeon General May 27, 2004. Available at: http://www.cdc.gov/tobacco/sgr/sgr_2004/pdf/executivesummary.pdf.
7. Missouri Department of Health and Senior Services (DHSS). MICA (Missouri Information for Community Assessment) Death. Available at: <http://www.dhss.mo.gov/DeathMICA/index.html>. Accessed: August, 2005.
8. Missouri Department of Health and Senior Services (DHSS). Missouri comprehensive tobacco use prevention program strategic plan 2003-2009 December, 2003. Available at: <http://www.dhss.mo.gov/SmokingAndTobacco/StrategicPlan.pdf>.
9. Missouri Department of Health and Senior Services (DHSS). Preventing obesity and other chronic diseases. Missouri's nutrition and physical activity plan 2005. Available at: <http://www.dhss.mo.gov/Obesity/ObesityBurdenWebversion.pdf>. Accessed: September, 2005.
10. Missouri Department of Mental Health. Maintaining good mental health. Available at: <http://www.dmh.mo.gov/cps/facts/stress>. Accessed: September, 2005.
11. National Institute of Health, National Institute of Mental Health. In harms way: Suicide in America. Sep 2005. Available at: <http://www.nimh.nih.gov/publicat/harmaway.cfm>. Accessed: September, 2005.
12. Naimi TS, Brewer RD, Mokdad A, Denny C, Serdula MK, Marks JS. Binge drinking among US adults. JAMA 2003;289:70-75. Available at: http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=12503979.
13. U.S. Substance Abuse and Mental Health Services Administration (SAMHSA), Office of Applied Studies. National Survey on Drug Use and Health, 2002 and 2003. Feb 2005. Available at: <http://oas.samhsa.gov/2k3State/ch5.htm>. Accessed: September, 2005.
14. U.S. Substance Abuse and Mental Health Services Administration (SAMHSA), National Mental Health Information Center. Clinical preventive services in substance abuse and mental health update: From science to services. Available at: <http://www.mentalhealth.samhsa.gov/publications/allpubs/SMA04-3906/>. Accessed: September, 2005.
15. Centers for Disease Control and Prevention (CDC). Perspectives in disease prevention and health promotion state action to prevent motor vehicle deaths and injuries among children and adolescents. MMWR.1982;31:488-490. Available at: <http://www.cdc.gov/mmwr/preview/mmwrhtml/00001156.htm>.
16. Missouri Department of Health and Senior Services (DHSS). MICA (Missouri Information for Community Assessment) Injury. Available at: <http://www.dhss.mo.gov/InjuryMICA/>. Accessed: August, 2005.

17. Centers for Disease Control and Prevention (CDC), National Center for Chronic Disease Prevention and Health Promotion. Arthritis. Available at: <http://www.cdc.gov/arthritis/arthritis/>. Accessed: September, 2005.
18. Data of Behavioral Risk Factor Surveillance Survey (BRFSS) provided by Missouri Department of Health and Senior Services (DHSS), Office of Surveillance E, Planning, and Health Information (OSEPHI),.
19. Centers for Disease Control and Prevention (CDC), National Center for Chronic Disease Prevention and Health Promotion. Communication campaigns - "Physical Activity. The Arthritis Pain Reliever". May 2005. Available at: http://www.cdc.gov/arthritis/campaigns/physical_activity/index.htm. Accessed: September, 2005.
20. Missouri Department of Health and Senior Services (DHSS). MICA (Missouri Information for Community Assessment) Cancer. Available at: <http://www.dhss.mo.gov/CancerMICA/index.html>. Accessed: August, 2005.
21. Missouri Department of Health and Senior Services (DHSS). MICA (Missouri Information for Community Assessment) Population. Available at: <http://www.dhss.mo.gov/PopulationMICA/>. Accessed: August, 2005.
22. Kochanek KD, Murphy SL, Anderson RN, Scott C. Deaths: final data for 2002. Natl Vital Stat Rep.2004;53:1-115. Available at: http://www.cdc.gov/nchs/data/nvsr/nvsr53/nvsr53_05.pdf.
23. Data provided by Missouri Department of Health and Senior Services (DHSS), Communicable Disease Surveillance.

Seniors (Age 65 and Older)

1. Missouri Department of Health and Senior Services (DHSS). MICA (Missouri Information for Community Assessment) Population. Available at: <http://www.dhss.mo.gov/PopulationMICA/>. Accessed: August, 2005.
2. Centers for Disease Control and Prevention (CDC). CDC WONDER. Bridged-Race Population Estimates (Vintage 2003) Request. Available at: <http://wonder.cdc.gov/Bridged-Race-v2003.HTML>. Accessed: August, 2005.
3. Centers for Disease Control and Prevention (CDC) NCCDPaHP. Healthy aging: Preventing disease and improving quality of life among older Americans. Available at: http://www.cdc.gov/nccdphp/aag/aag_aging.htm. Accessed: September, 2005.
4. Missouri Department of Health and Senior Services (DHSS). MICA (Missouri Information for Community Assessment) Death. Available at: <http://www.dhss.mo.gov/DeathMICA/index.html>. Accessed: August, 2005.
5. Centers for Disease Control and Prevention (CDC). CDC WONDER- Leading causes of death. Available at: <http://webapp.cdc.gov/sasweb/ncipc/leadcaus10.html>. Accessed: August, 2005.
6. Centers for Disease Control and Prevention (CDC), National Center for Chronic Disease Prevention and Health Promotion. Health information for older adults. Available at: http://www.cdc.gov/aging/health_issues.htm. Accessed: September, 2005.
7. Ries LAG, Eisner MP, Kosary CL, et al. SEER cancer statistics review, 1975-2001. Bethesda, MD: National Cancer Institute, 2004. Available at: http://seer.cancer.gov/csr/1975_2001/.
8. Centers for Disease Control and Prevention (CDC), National Center for Chronic Disease Prevention and Health Promotion. Facts on quitting smoking, health consequences of smoking, & other related information. Available at: <http://www.cdc.gov/tobacco/news/HealthConsequences.htm>. Accessed: September, 2005.

9. Missouri Department of Health and Senior Services (DHSS). Missouri comprehensive tobacco use prevention program strategic plan 2003-2009 December, 2003. Available at: <http://www.dhss.mo.gov/SmokingAndTobacco/StrategicPlan.pdf>.
10. Data of Behavioral Risk Factor Surveillance Survey (BRFSS) provided by Missouri Department of Health and Senior Services (DHSS), Office of Surveillance Evaluation, Planning, and Health Information (OSEPHI).
11. Missouri Department of Health and Senior Services (DHSS). Preventing obesity and other chronic diseases. Missouri's nutrition and physical activity plan 2005. Available at: <http://www.dhss.mo.gov/Obesity/ObesityBurdenWebversion.pdf>. Accessed: September, 2005.
12. Centers for Disease Control and Prevention (CDC), National Center for Chronic Disease Prevention and Health Promotion. Arthritis. Available at: <http://www.cdc.gov/arthritis/arthritis/>. Accessed: September, 2005.
13. Missouri Department of Health and Senior Services (DHSS). MICA (Missouri Information for Community Assessment) Cancer. Available at: <http://www.dhss.mo.gov/CancerMICA/index.html>. Accessed: August, 2005.
14. Missouri Department of Health and Senior Services (DHSS). MICA (Missouri Information for Community Assessment) Hospital Discharge. Available at: http://www.dhss.mo.gov/D_C_DofCMICA/. Accessed: September, 2005.
15. Centers for Disease Control and Prevention (CDC), National Center for Injury Prevention and Control. Older adult drivers: Fact sheet. Aug 5, 2004. Available at: <http://www.cdc.gov/ncipc/factsheets/older.htm>. Accessed: October, 2005.
16. Insurance Institute for Highway Safety (IIHS). Fatality facts 2003: Older people. Arlington, VA: IIHS, 2003. Available at: http://www.highwaysafety.org/research/fatality_facts/olderpeople.html.
17. U.S. Department of Transportation, National Highway Traffic Safety Administration. A compendium of law enforcement older driver programs. Available at: <http://www.nhtsa.dot.gov/people/injury/olddrive/LawEnforcementOlderDriver03/missouri.htm>. Accessed: October, 2005.
18. Missouri General Assembly. Missouri Revised Statutes, Chapter 302. Section 302.291 August 28, 2004. Available at: <http://www.moga.state.mo.us/STATUTES/STATUTES.HTM#T01>.
19. Health Canada. Healthy aging- Prevention of unintentional injuries among seniors. Ottawa, Ontario: Health Canada, 2002. Cat.: H39-612/2002-6E. Available at: http://www.phac-aspc.gc.ca/seniors-aines/pubs/workshop_healthyaging/pdf/injury_prevention_e.pdf.
20. Dellinger AM, Langlois JA, Li G. Fatal crashes among older drivers: decomposition of rates into contributing factors. *Am J Epidemiol*. 2002;155:234-241. Available at: http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=11821248.
21. Centers for Disease Control and Prevention (CDC), National Center for Injury Prevention and Control. Older adult drivers: CDC activities. Aug 5, 2004. Available at: <http://www.cdc.gov/ncipc/factsheets/olderactivities.htm>. Accessed: October, 2005.
22. Department of the Secretary of State. FAP-II: functional ability profiles governing physical, emotional and mental competence to operate a motor vehicle. Augusta, ME: Department of the Secretary of State, Bureau of Motor Vehicles, 1995.

23. Murphy SL. Deaths: final data for 1998. Natl Vital Stat Rep.2000;48:1-105. Available at: http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=10934859.
24. Alexander BH, Rivara FP, Wolf ME. The cost and frequency of hospitalization for fall-related injuries in older adults. Am J Public Health.1992;82:1020-1023. Available at: http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=1609903.
25. Centers for Disease Control and Prevention (CDC), National Center for Injury Prevention and Control. Injuries among older adults. Mar 07, 2005. Available at: <http://www.cdc.gov/ncipc/olderadults.htm>. Accessed: October, 2005.
26. Sterling DA, O'Connor JA, Bonadies J. Geriatric falls: injury severity is high and disproportionate to mechanism. J Trauma.2001;50:116-119. Available at: http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=11231681.
27. Donald IP, Bulpitt CJ. The prognosis of falls in elderly people living at home. Age Ageing.1999;28:121-125. Available at: http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=10350407.
28. Graafmans WC, Ooms ME, Hofstee HM, Bezemer PD, Bouter LM, Lips P. Falls in the elderly: a prospective study of risk factors and risk profiles. Am J Epidemiol.1996;143:1129-1136. Available at: http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=8633602.
29. American Geriatrics Society, British Geriatrics Society, American Academy of Orthopaedic Surgeons Panel on Falls Prevention. Guideline for the prevention of falls in older persons. J Am Geriatr Soc.2001;49:664-672. Available at: http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=11380764.
30. Tinetti ME, Speechley M. Prevention of falls among the elderly. N Engl J Med.1989;320:1055-1059. Available at: http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=2648154.
31. Ray W, Griffin MR. Prescribed medications and the risk of falling. Topics in Geriatric Rehabilitation.1990;5:12-20.
32. Lord SR, Dayhew J. Visual risk factors for falls in older people. J Am Geriatr Soc.2001;49:508-515. Available at: http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=11380741.
33. Cumming RG. Epidemiology of medication-related falls and fractures in the elderly. Drugs and Aging.1998;12:43-53.
34. Judge JO, Lindsey C, Underwood M, Winsemius D. Balance improvements in older women: effects of exercise training. Phys Ther.1993;73:254-262; discussion 263-255. Available at: http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=8456144.
35. Lord SR, Caplan GA, Ward JA. Balance, reaction time, and muscle strength in exercising and nonexercising older women: a pilot study. Arch Phys Med Rehabil.1993;74:837-839. Available at: http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=8347068.

36. Campbell AJ, Robertson MC, Gardner MM, Norton RN, Buchner DM. Falls prevention over 2 years: a randomized controlled trial in women 80 years and older. *Age Ageing*.1999;28:513-518. Available at: http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=10604501.
37. Centers for Disease Control and Prevention (CDC), National Center for Injury Prevention and Control. Falls and hip fractures among older adults. Sep 9, 2005. Available at: <http://www.cdc.gov/ncipc/factsheets/falls.htm>. Accessed: October, 2005.
38. Northridge ME, Nevitt MC, Kelsey JL, Link B. Home hazards and falls in the elderly: the role of health and functional status. *Am J Public Health*.1995;85:509-515. Available at: http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=7702114.
39. Connell BR. Role of the environment in falls prevention. *Clin Geriatr Med*.1996;12:859-880. Available at: http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=8890120.
40. Gill TM, Williams CS, Robison JT, Tinetti ME. A population-based study of environmental hazards in the homes of older persons. *Am J Public Health*.1999;89:553-556. Available at: http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=10191800.
41. Alzheimer's Association. What is Alzheimer's disease? Available at: <http://www.alz.org/AboutAD/WhatIsAD.asp>. Accessed: September, 2005.
42. Geriatric Mental Health Foundation. Alzheimer's and related dementias. Fact sheet. Available at: http://www.gmhfonline.org/gmhf/consumer/factsheets/dementia_factsheet.html. Accessed: September, 2005.
43. Alzheimer's Association. Fact sheet: Alzheimer's disease growth. Available at: http://www.alz.org/Resources/FactSheets/FSADState_Growth.pdf. Accessed: September, 2005.
44. Alzheimer's Association. Fact sheet: About Alzheimer's disease. Available at: <http://www.alz.org/Resources/FactSheets/FSADFacts.pdf>. Accessed: September, 2005.
45. Centers for Disease Control and Prevention (CDC), National Center for Chronic Disease Prevention and Health Promotion. Fact sheet: Oral health for older Americans. Available at: <http://www.cdc.gov/OralHealth/factsheets/adult-older.htm>. Accessed: September, 2005.
46. U.S. Census Bureau. Current Population Survey, 2005 Annual Social and Economic Supplement, Table HI05. Jul 19, 2005. Available at: http://pubdb3.census.gov/macro/032005/health/h05_000.htm. Accessed: September, 2005.
47. Medicaid Statistical Information System. Medicaid Statistical Information System Summary Reports, Federal fiscal year 2004. Medicaid payments by service category, and by age, by sex, and by race/ethnicity. 2005.
48. Centers for Medicare & Medicaid Services. Medicare information resource. Feb 2005. Available at: <http://www.cms.hhs.gov/medicare/>. Accessed: November, 2005.

49. Centers for Medicare & Medicaid Services. Medicare enrollment by State, 2001. Available at: <http://www.cms.hhs.gov/researchers/pubs/datacompendium/2002/02pg7475.pdf>.
50. Centers for Medicare & Medicaid Services. Medicare estimated benefit payments by State, Fiscal Year 2001. Available at: <http://www.cms.hhs.gov/researchers/pubs/datacompendium/2003/03pg71.pdf>.

Infectious Diseases

1. Centers for Disease Control and Prevention (CDC). Ten great public health achievements - United States, 1900-1999. MMWR.1999;48:241-243. Available at: <http://www.cdc.gov/mmwr/preview/mmwrhtml/00056796.htm>.
2. Centers for Disease Control and Prevention (CDC). Achievements in public health, 1900-1999: Control of infectious diseases. MMWR.1999;48:621-629. Available at: <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm4829a1.htm>.
3. Centers for Disease Control and Prevention (CDC). CDC WONDER- Leading causes of death. Available at: <http://webapp.cdc.gov/sasweb/ncipc/leadcaus10.html>. Accessed: August, 2005.
4. State regulation 19 CSR 20-20.010-20.080.
5. Centers for Disease Control and Prevention (CDC). Tiered use of inactivated influenza vaccine in the event of a vaccine shortage. MMWR Morb Mortal Wkly Rep.2005;54:749-750. Available at: http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=16079741.
6. Centers for Disease Control and Prevention (CDC), National Immunization Program. Pneumococcal - In short. June 27, 2001. Available at: <http://www.cdc.gov/nip/diseases/Pneumo/vac-chart.htm>. Accessed: September, 2005.
7. Centers for Disease Control and Prevention (CDC), National center for HIV, STD, and TB Prevention. Questions and answers about TB, 2005. Available at: <http://www.cdc.gov/nchstp/tb/faqs/qa.htm>. Accessed: September, 2005.
8. Missouri department of Health and Senior Services (DHSS), Office of Surveillance. Bioterrorism, communicable disease, and environmental surveillance 2004 annual report, 2005. Available at: <http://www.dhss.mo.gov/CommunicableDisease/Annual04/Annual04.pdf>.
9. Missouri Department of Health and Senior Services (DHSS). MICA (Missouri Information for Community Assessment) Death. Available at: <http://www.dhss.mo.gov/DeathMICA/index.html>. Accessed: August, 2005.
10. Centers for Disease Control and Prevention (CDC). Essential components of a tuberculosis prevention and control program. Recommendations of the Advisory Council for the Elimination of Tuberculosis. MMWR Recomm Rep.1995;44:1-16. Available at: http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=7565539.

11. Centers for Disease Control and Prevention (CDC), Food Safety Office. Available at: <http://www.cdc.gov/foodsafety/>. Accessed: September, 2005.
12. Data provided by Missouri Department of Health and Senior Services (DHSS), Communicable Disease Surveillance.
13. Centers for Disease Control and Prevention (CDC), National Center for Infectious Diseases. Viral hepatitis A. Sep 15, 2005. Available at: <http://www.cdc.gov/ncidod/diseases/hepatitis/a/vax>. Accessed: September, 2005.
14. Partnership for Food Safety Education. Fight BAC! Four steps to food safety. Available at: <http://www.fightbac.org/main.cfm>. Accessed: September, 2005.
15. Centers for Disease Control and Prevention (CDC), National Center for Infectious Diseases. Viral hepatitis B - Fact sheet. Sep 15, 2005. Available at: <http://www.cdc.gov/ncidod/diseases/hepatitis/b/fact.htm>. Accessed: September, 2005.
16. Data provided by Missouri Department of Health and Senior Services (DHSS), Health Statistics.
17. Centers for Disease Control and Prevention (CDC), National Center for Infectious Diseases. Viral hepatitis C - Fact sheet. Sep 15, 2005. Available at: <http://www.cdc.gov/ncidod/diseases/hepatitis/c/fact.htm>. Accessed: September, 2005.

Missouri's Health Care System

1. Missouri Department of Health and Senior Services (DHSS), Unit of Emergency Medical Services (EMS).
2. U.S. Department of Health and Human Services, Health Resources and Services Administration. Shortage designation. Available at: <http://bhpr.hrsa.gov/shortage/>. Accessed: September, 2005.
3. U.S. Department of Health and Human Services, Health Resources and Services Administration. Health professional shortage area - Dental designation criteria. Available at: <http://bhpr.hrsa.gov/shortage/hpsacritdental.htm>. Accessed: September, 2005.
4. Missouri Department of Health and Senior Services (DHSS). DHSS strategic plan 2000-2005, 2005 update, 2005.
5. Data provided by Missouri Department of Health and Senior Services (DHSS), 2003 Pediatric Nutrition Surveillance, Missouri.
6. Missouri Department of Health and Senior Services (DHSS). MICA (Missouri Information for Community Assessment) Population. Available at: <http://www.dhss.mo.gov/PopulationMICA/>. Accessed: August, 2005.

Surveillance and Data Gaps

1. State Health Access Data Assistance Center. 2004 Missouri Health Care Insurance and Access Survey: select results, 2005. Available at: http://www.dhss.mo.gov/DataAndStatisticalReports/Missouri_Final_Report.pdf.
2. Centers for Disease Control and Prevention (CDC). Workplace safety & health. Available at: <http://www.cdc.gov/node.do/id/0900f3ec8000ec09>. Accessed: September, 2005.

3. Centers for Disease Control and Prevention (CDC), National Institute of Occupational Safety and Health (NIOSH). Worker health chartbook 2004: NIOSH, 2004. Available at: <http://www.cdc.gov/niosh/docs/chartbook/>.
4. Missouri Department of Labor and Industrial Relations (DOLIR). Occupational injuries and illnesses. Available at: <http://www.dolir.missouri.gov/lmi/index.htm>. Accessed: October, 2005.
5. Centers for Disease Control and Prevention (CDC). Health topic: Environmental hazards and exposure. Available at: <http://www.cdc.gov/doc.do/id/0900f3ec80283907/>. Accessed: September, 2005.
6. Centers for Disease Control and Prevention (CDC), National Center for Chronic Disease Prevention and Health Promotion. Oral health: Preventing cavities, gum disease, and tooth loss - At a glance, 2005. Available at: http://www.cdc.gov/nccdphp/aag/aag_oh.htm. Accessed: September, 2005.
7. Missouri Department of Health and Senior Services (DHSS). MICA (Missouri Information for Community Assessment) Death. Available at: <http://www.dhss.mo.gov/DeathMICA/index.html>. Accessed: August, 2005.
8. Missouri Department of Health and Senior Services (DHSS), Office of Primary Care and Rural Health.

Appendix

1. Meyer PA, Pivetz T, Dignam TA, Homa DM, Schoonover J, Brody D. Surveillance for elevated blood lead levels among children--United States, 1997-2001. *MMWR Surveill Summ* 2003;52(10):1-21.
2. Missouri Department of Health and Senior Services (DHSS). MICA (Missouri Information for Community Assessment) Death. [cited 2005 August]; Available from: <http://www.dhss.mo.gov/DeathMICA/index.html>
3. Missouri Department of Health and Senior Services (DHSS). MICA (Missouri Information for Community Assessment) Population. [cited 2005 August]; Available from: <http://www.dhss.mo.gov/PopulationMICA/>
4. Kochanek KD, Murphy SL, Anderson RN, Scott C. Deaths: final data for 2002. *Natl Vital Stat Rep* 2004;53(5):1-115.
5. Centers for Disease Control and Prevention (CDC). CDC WONDER- Leading causes of death. [cited 2005 August]; Available from: <http://webapp.cdc.gov/sasweb/ncipc/leadcaus10.html>
6. Centers for Disease Control and Prevention (CDC). CDC WONDER. Bridged-Race Population Estimates (Vintage 2003) Request. [cited 2005 August]; Available from: <http://wonder.cdc.gov/Bridged-Race-v2003.HTML>
7. U.S. Census Bureau. Technical documentation: Census 2000 Summary File 3. Washington, DC: U.S. Census Bureau; 2005.
8. Missouri Department of Health and Senior Services (DHSS). MICA (Missouri Information for Community Assessment) Emergency Room. [cited 2005 August]; Available from: <http://www.dhss.mo.gov/EmergencyRoomMICA/index.html>
9. Centers for Disease Control and Prevention. Foodborne Illness. [cited 2005 December]; Available from: http://www.cdc.gov/ncidod/dbmd/diseaseinfo/foodborneinfections_g.htm

10. U.S. Census Bureau. CPS (Current Population Survey) Health Insurance Definitions. August 30, 2005 [cited 2005 September]; Available from: <http://www.census.gov/hhes/www/hlthins/hlthinstypes.html>
11. U.S. Department of Health and Human Services, Health Resources and Services Administration. Health professional shortage area - Primary medical care designation criteria. [cited 2005 November]; Available from: <http://bhpr.hrsa.gov/shortage/hpsacritpcm.htm>
12. U.S. Department of Health and Human Services, Health Resources and Services Administration. Health professional shortage area - Dental designation criteria. [cited 2005 September]; Available from: <http://bhpr.hrsa.gov/shortage/hpsacritdental.htm>
13. Missouri Department of Health and Senior Services (DHSS). MICA (Missouri Information for Community Assessment) Hospital Discharge. [cited 2005 September]; Available from: http://www.dhss.mo.gov/D_C_DofCMICA/
14. U.S. Census Bureau. American Community Survey, 2003 subject definitions. Available from: http://www.census.gov/acs/www/Downloads/2003/usedata/Subject_Definitions.pdf
15. Hoyert DL, Kung HC, Smith BL. Deaths: preliminary data for 2003. *Natl Vital Stat Rep* 2005;53(15):1-48.
16. Anderson RN, Smith BL. Deaths: leading causes for 2002. *Natl Vital Stat Rep* 2005;53(17):1-89.
17. Martin JA, Hamilton BE, Sutton PD, Ventura SJ, Menacker F, Munson ML. Births: final data for 2003. *Natl Vital Stat Rep* 2005;54(2):1-116.
18. Centers for Medicare & Medicaid Services. Glossary. Oct 20, 2005 [cited 2005 November]; Available from: <http://www.cms.hhs.gov/glossary/>
19. Centers for Medicare & Medicaid Services. Medicare estimated benefit payments by State, Fiscal Year 2001. 2003; Available from: <http://www.cms.hhs.gov/researchers/pubs/datacompendium/2003/03pg71.pdf>
20. Hedley AA, Ogden CL, Johnson CL, Carroll MD, Curtin LR, Flegal KM. Prevalence of overweight and obesity among US children, adolescents, and adults, 1999-2002. *JAMA* 2004;291(23):2847-50.
21. U.S. Census Bureau. Poverty thresholds. August 30, 2005 [cited 2005 September]; Available from: <http://www.census.gov/hhes/www/poverty/threshld.html>
22. U.S. Census Bureau. How the Census Bureau measures poverty (official measure). August 30, 2005 [cited 2005 September]; Available from: <http://www.census.gov/hhes/www/poverty/povdef.html>
23. U.S. Census Bureau. Current Population Survey, 2004 Annual Social and Economic Supplement, POV46-Poverty status by state. Nov 22, 2004 [cited 2005 July]; Available from: <http://pubdb3.census.gov/macro/032004/pov/toc.htm>
24. Centers for Disease Control and Prevention (CDC), National Center for Injury Prevention and Control. WISQARS years of potential life lost (YPLL) reports, 1999 - 2002. Nov 30, 2004 [cited 2005 August]; Available from: <http://webapp.cdc.gov/sasweb/ncipc/ypll10.html>